JUNE 16, 1958

A PROGRAM FOR MANAGEMENT
1958 . . . No. 5

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

PRICING FOR PROFIT

Page 87

Friendly inferno— to make BETTER GEARS

THIS 100% forced convection furnace is just one unit of the highly specialized equipment used in making "Double Diamond" gears. Because we manufacture gears—and only gears—we avail ourselves of every kind of improved technique and equipment that will produce completely controlled quality.

What does this mean to you? Simply this:

BETTER GEARS that offer the advantages of lower installed cost, economical and dependable service on the job for which you buy them . . . gears that do credit to your product and your reputation.

Our gear engineers are available for consultation. Just write.

In this controlled atmosphere furnace, 100% forced convection heating of gears by Automotive Gear Division insures uniform heating of every part to the desired temperature. Through the entire operation—pre-heating, carburizing, hardening and modified Marquenching or regular quenching in selected grades of oil—time, temperature and atmosphere in each zone are automatically controlled. Thus, the quality that is cut into the gear is retained.

EATON

AUTOMOTIVE GEAR DIVISION
MANUFACTURING COMPANY
RICHMOND, INDIANA

GEARS FOR AUTOMOTIVE, FARM EQUIPMENT AND GENERAL INDUSTRIAL APPLICATIONS
GEAR-MAKERS TO LEADING MANUFACTURERS

Bethlehem distributors are equipped for such services as cutting, slitting, sawing, testing.

"We Rely Heavily on Local Distributors"

s B. Hoyt, ACF's Vice-President in Charge of Purchases, and model of sample car built for the Bangor & Aroostook.

Before producing an order of freight cars for a customer, American Car and Foundry, Division of ACF Industries, Inc., normally builds a full-sized prototype, or sample. This sample car is inspected and thoroughly checked by ACF itself and by the customer's officials.

From local sources come many items used in the building of the prototypes. "For example," says Phillips B. Hoyt, Vice-President in Charge of Purchases, "we rely heavily on local distributors for the steel structurals, hot-rolled sheets, and bars used in producing our sample cars. In addition, MRO items for cars in service are made from warehouse steel, so that prompt deliveries are always possible."

As usual, American Car and Foundry drew from distributor stocks when building a recent sample car for the Bangor & Aroostook. Early completion of the sample was aided by the distributor's quick delivery of structurals, sheets, and bars.

HERE'S WHAT THE DISTRIBUTOR OFFERS YOU. Bethlehem sheets, bars, shapes, plates, tool steel, and other steel products are available through distributors from coast to coast. Stocks are carefully selected to meet the needs of the local areas served. But the distributor offers you more than a warehouse full of steel. He's equipped for such services as slitting, sawing, flame-cutting, testing. And you can rely on his deliveries!

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Bethlehem Pacific Coast Steel Corporation, San Francisco

BETHLEHEM STEEL

Call the distributor—your Shopping Center for Steel

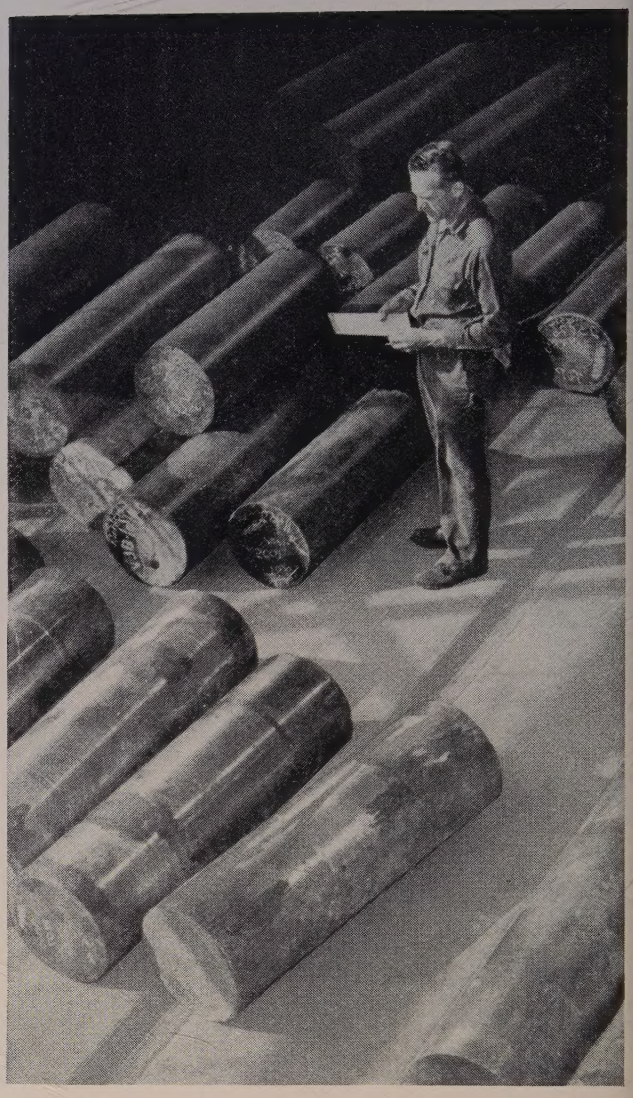
Take a New Look at

TITANIUM

Wonder metal? Restricted supply? Not today. Titanium is daily *proving* its economic advantages in more and more industrial applications.

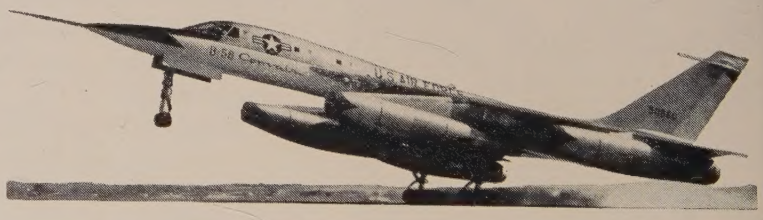
And Mallory-Sharon...world's largest integrated producer of special metals... is ready *now* to assist you in designing with titanium. We can supply your requirements for titanium and titanium alloy sheet, strip, rod, bar, plate and other mill products...many of them from stock.

Check below for ways titanium and its alloys can serve you now! Then write us about your requirements, or contact our nearest sales office.



For availability – *Delivery time on titanium has been cut by Mallory-Sharon's ingot inventory in certain grades and analyses. Here, orders can be started in the ingot stage, saving time for fabricators. In addition, a wide range of sheet and bar sizes can be shipped direct from stock.*

For corrosion resistance—*Turbine impeller made from titanium has given four years' service in highly corrosive application that killed other metals in weeks or even hours. Impeller agitates slurry containing cobalt, nickel, copper arsenic, iron and sulfuric acid.*



For high strength-to-weight—*In the U.S. Air Force's B-58 Hustler, built by Convair, Fort Worth, heat-treated titanium alloy was substituted for alloy steel—for wing fittings bearing heavy loads. Result: 44% saving in weight, with strength equal or superior to the previous material.*

For technical facts *write for "Titanium Fact File"—giving advantages, metallurgy, corrosion properties, information on machining, welding, forming. Our Service Engineering group is ready to assist you.*

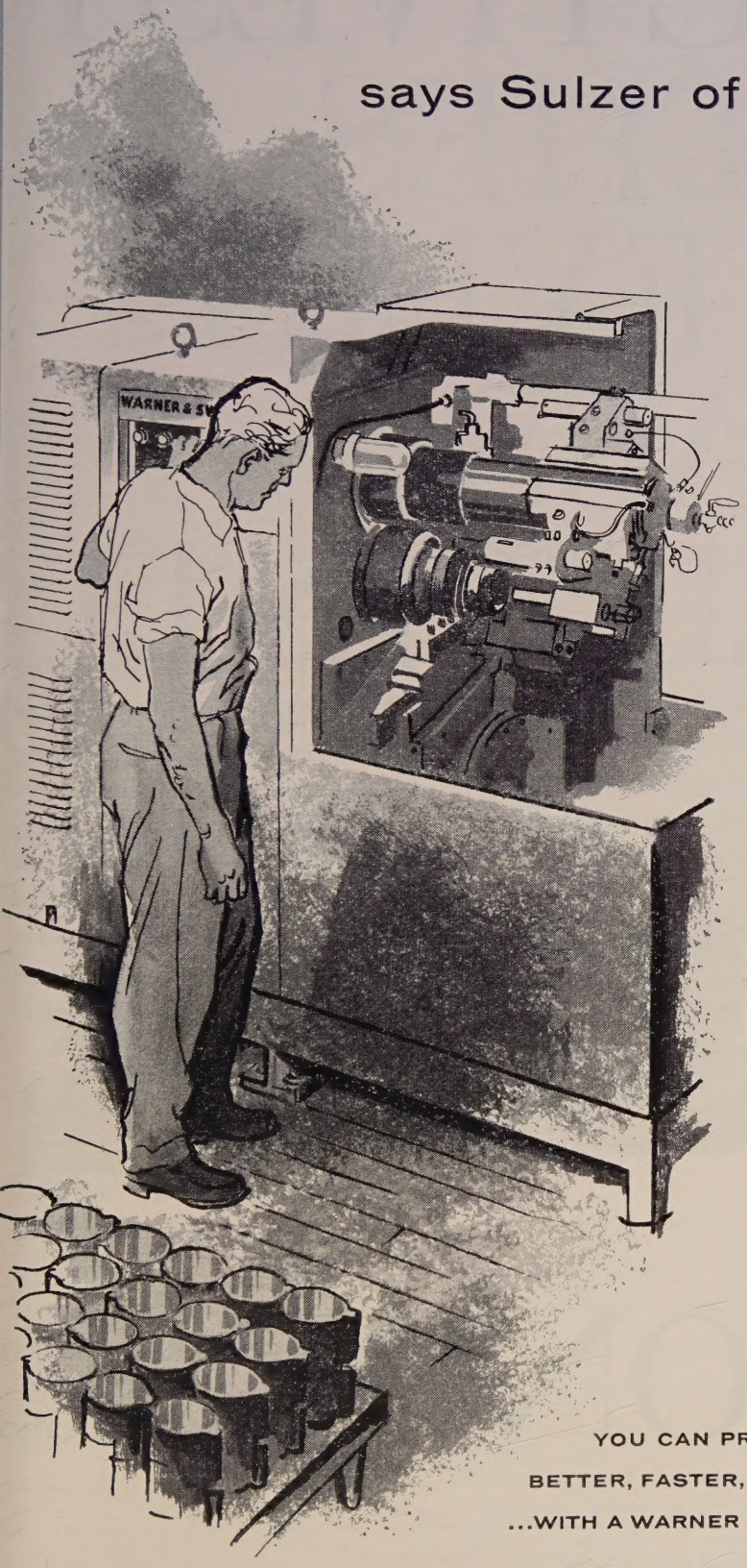
MALLORY SHARON

MALLORY-SHARON METALS CORPORATION • NILES, OHIO

Integrated producer of Titanium • Zirconium • Special Metals

"Our biggest time-saver yet"

says Sulzer of Switzerland



Warner & Swasey 1 AC Single Spindle Automatic gives world-famous Sulzer Brothers Ltd. the biggest time saving yet achieved at their Soleure Works by introduction of any single new machine.

When a machine tool establishes a new time-saving record at 123-year old, production-minded Sulzer Brothers Ltd.—that's news! Yet the savings in machining time are only part of the performance story being written in this prominent Swiss machinery manufacturing plant by their new Warner & Swasey 1 AC Automatic Chucker.

Here are the facts:

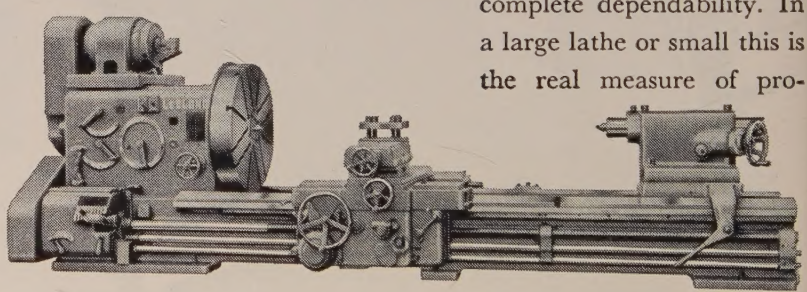
- Production on the 1 AC is 2½ times greater than on conventional turret lathes in their plant.
- Operations transferred to the 1 AC have been reduced to 55% of their former cost.
- Not only has Sulzer's traditional high standards of quality been maintained, but because of the 1 AC's precision boring ability, many needs for subsequent sizing operations have been eliminated.
- Accuracy that repeats itself and precision tooling have brought noteworthy comment.
- In Sulzer's own words, "As we write this, we have had no breakdowns, troubles or machine repairs." . . . an important factor for a plant that's located over 4,300 miles away from the source of supply.

But, even now, this record is being bettered. Recent installation of a second Warner & Swasey Chucker—a 2 AC—is permitting operation of both machines by only a single operator—thus another chapter in Swiss time savings goes into the book.

YOU CAN PRODUCE IT
BETTER, FASTER, FOR LESS
...WITH A WARNER & SWASEY

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

THE PRODUCTIVEST LATHES IN EVERY CLASS YOU'LL FIND IN THE LINE OF LeBLOND



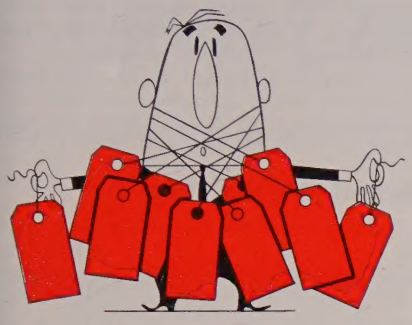
This is the LeBlond 50" heavy duty lathe. Power, rigidity, stamina. Everything you need to get maximum metal removal with complete dependability. In a large lathe or small this is the real measure of productivity. Write for your LeBlond Complete Line Catalog No. C-58.

THE R. K. LeBLOND MACHINE TOOL CO. CINCINNATI 8, OHIO

World's Largest Builder of A Complete Line of Lathes for More Than 71 Years

This Week in STEEL The Metalworking Weekly

June 16, 1958
Vol. 142 No. 24



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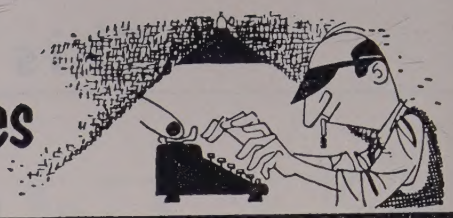
Index available semiannually. STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

behind the scenes



Price Fixing

How about the delicate hand on this week's cover, holding the price tickets so daintily? It seems impossible, considering the evidence. Item: The hand obviously lacks metacarpals, phalanges, abductors, flexors, and opponens. Item: The hand is lightly holding objects. Conclusion: Here is another triumph of art over nature. And, we might add, another triumph for STEEL because the cover promotes a particularly timely Program for Management article by Associate Managing Editor John Morgan. Titled "Pricing for Profit," it deals with facts and theories.

Proper pricing is the foundation of profitable business operation. It is strange and wonderful in all its manifestations. With some operators it is at once a game and a challenge. People have haggled over prices since the dawn of speech, and it is quite likely they will continue to guess what the traffic will bear until heaven obtains on earth. Until that happy time, however, when the vender shall lie down with the vendee, and discounts shall be no more, it is to the interest of all that the price should be right.

Mr. Morgan points out that price fighting defeats its own ends. While competitors slug it out toe to toe on the price line, it is possible that the consumer may profit temporarily, but the advantage is fleeting. In the long run, price fighting doesn't generate more business; it simply generates more problems.

Prices should be established scientifically. Whether you're selling apples or locomotives, you should know how to price for profit. The article begins on Page 87.

Offschedule, Indeed

When we graduate to the status of a beachcomber, we can throw away calendars, sell our clocks and watches, and surrender to the stars our present conception of time. In the meantime, segments of time are important, and we guide our every act by the spacing of the hours. Consider, for example, this puzzling horological sequence: This is being written at 2 p.m., June 5; it will appear in STEEL under the date of June 16, but the magazine will be mailed on the 12th and 13th. Don't go away; we are still sneaking up on our subject, which is STEEL's Industrial Production Index figure for the week ended May 31. A preliminary figure for that week appeared on Page 73 June 9, but the corrected figure will appear in the June 16 issue. Associate Editor Robert Jaynes, who fiddles with the figures, won't have the corrected figure (including the two decimal points) until 4 p.m. today—which, as you may recall isn't the 16th, but 5th.

When Rapid Robert relays the final calculation, we can award the price of dinner for two to the reader who made the closest guess. (For those who came in late, back on May 5 we asked for advance information on STEEL's Industrial Production Index figure for the week ending May 31—the corrected figure, that is, including 2 decimal points.)

Mr. Jaynes is obliged to wait for final figures on freight carloadings and auto assemblies before he can arrive at the true index, so we'll have to wait, too.

Art of Wasting Time

While we are waiting and killing time, do you mind if we send a greeting to your foot? There have been odes to eyebrows, and hands, and lips, and throats —so why not a foot? Anyway, the anatomy book is still open (so from where else do you suppose we stole those references in the opening paragraph?), and here we go:

We send a greeting to you, foot
(Which is so full of items,
We have to list them, every one:
'T would never do to slight 'em!)

Astragalus, hello, hello!
Malleolus internal—
Navicular, and cuneiform
(The middle and internal.)

Hello, then, to your phalanges all,
Hello, your sesamoid;
Ah, greetings to the calcis os,
And howdy to your cuboid!

We greet the metatarsus, too,
And sinews with decorum;
Hello to other bones, and eke
The flexor digitorum.

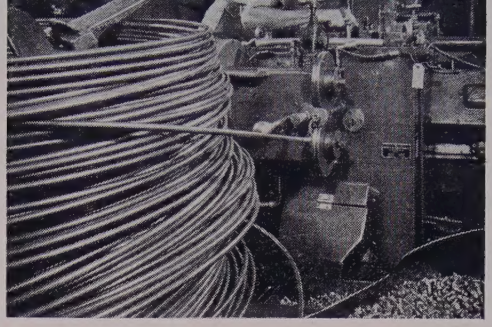
Announcement Stymied

Word has just come that Mr. Jaynes cannot compute the corrected figure until late tomorrow afternoon. That means we cannot print the name of the winner this week. Those who are interested may return to this page June 23, but we have a sneaking suspicion that nobody will bother, after the way we built them up to a letdown.

At the moment, three prophets seem to have the inside track, but we won't mention names because a spurt in the final figure might eliminate them. That would leave us looking for return greetings from a foot—or, rather, from three feet . . . so hastily exeunt.

Shrdlu

(Metalworking Outlook—Page 41)



This modern Cold Header forces wire drawn from Youngstown Rods to flow inside the dies. It spills out bolt or screw blanks by the thousands— every hour, all day long.

Accent on Excellence

Youngstown cold heading and scrapless nut quality rods and bars

Russell, Burdsall & Ward Bolt and Nut Company of Port Chester, N. Y. is one of the world's largest and best known fastener producers with plants at Coraopolis, Pa., Rock Falls, Ill., and Los Angeles, Calif. They stated in one of their recent advertisements:

"The cold heading method (an RB&W development that revolutionized bolt making) calls for use of uniform, high quality raw material. With constant quality control, RB&W makes sure our cold headers get the proper 'diet'."

Youngstown's Cold Heading and Scrapless Nut Quality Rods and Bars in coils answer RB&W's rigid requirements. They find them to be internally sound, uniform in both physical structure and chemical composition—as well as free from injurious seams and slivers, which cause rejects, reduced profits.

Wherever steel becomes a part of things *you* make, the high standards of Youngstown *quality*, the personal touch in Youngstown *service* will help you create products with an "accent on excellence".

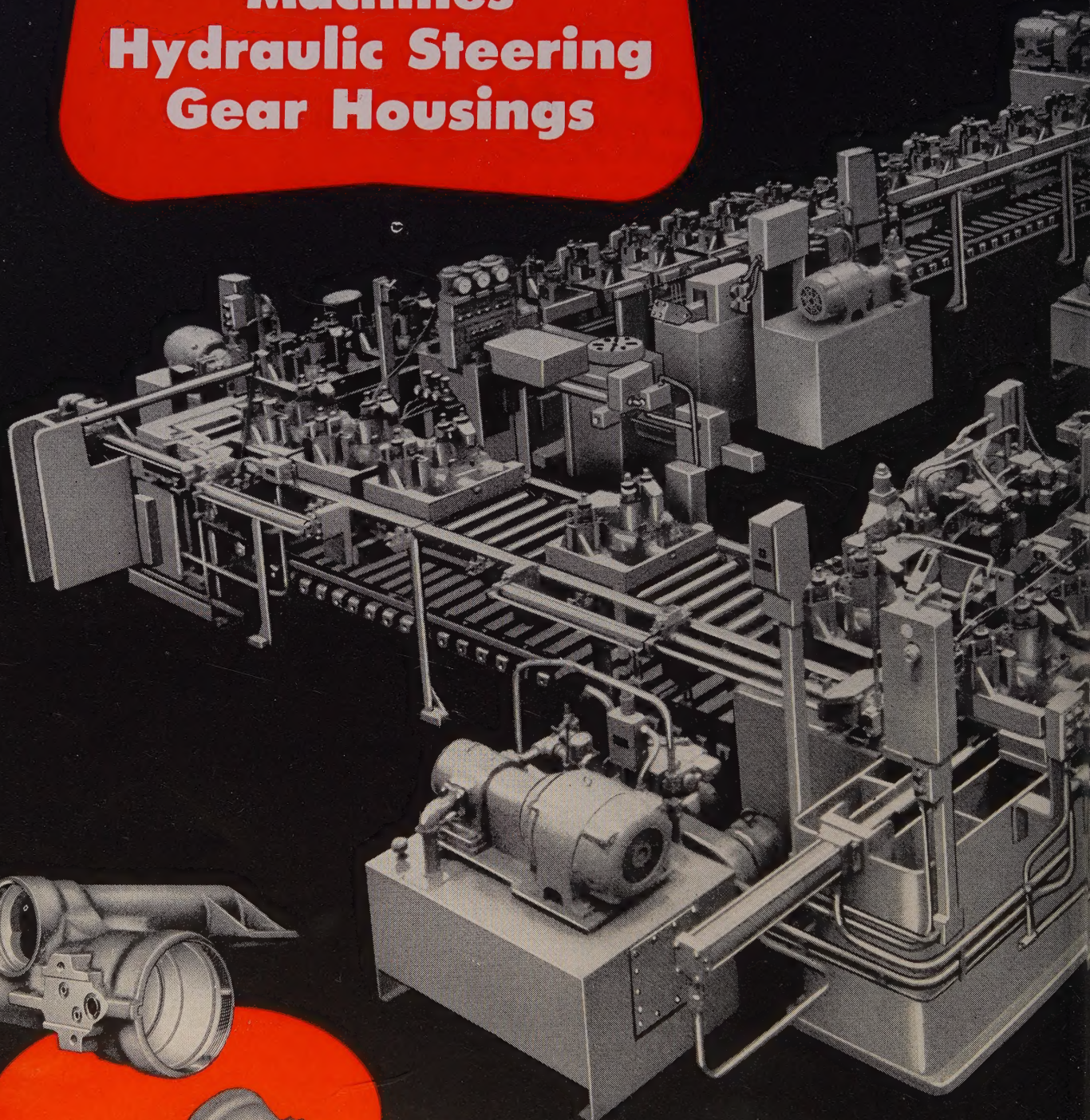
RB&W
113th year

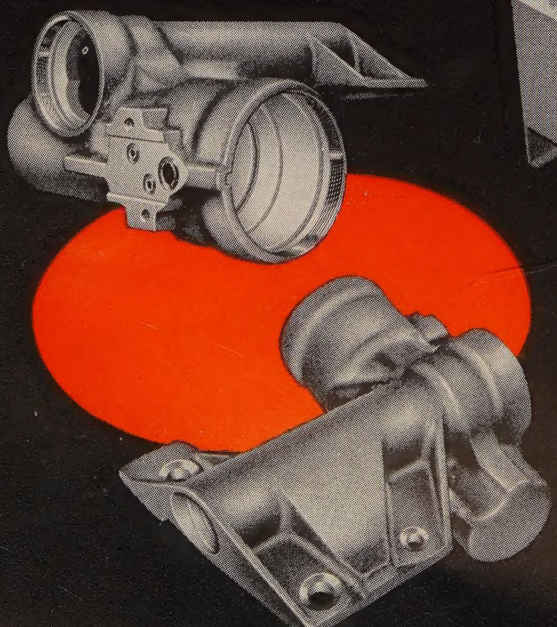
QUALITY YOUNGSTOWN SERVICE

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel
Youngstown, Ohio

Sectionized Transfer-matic Machines Hydraulic Steering Gear Housings





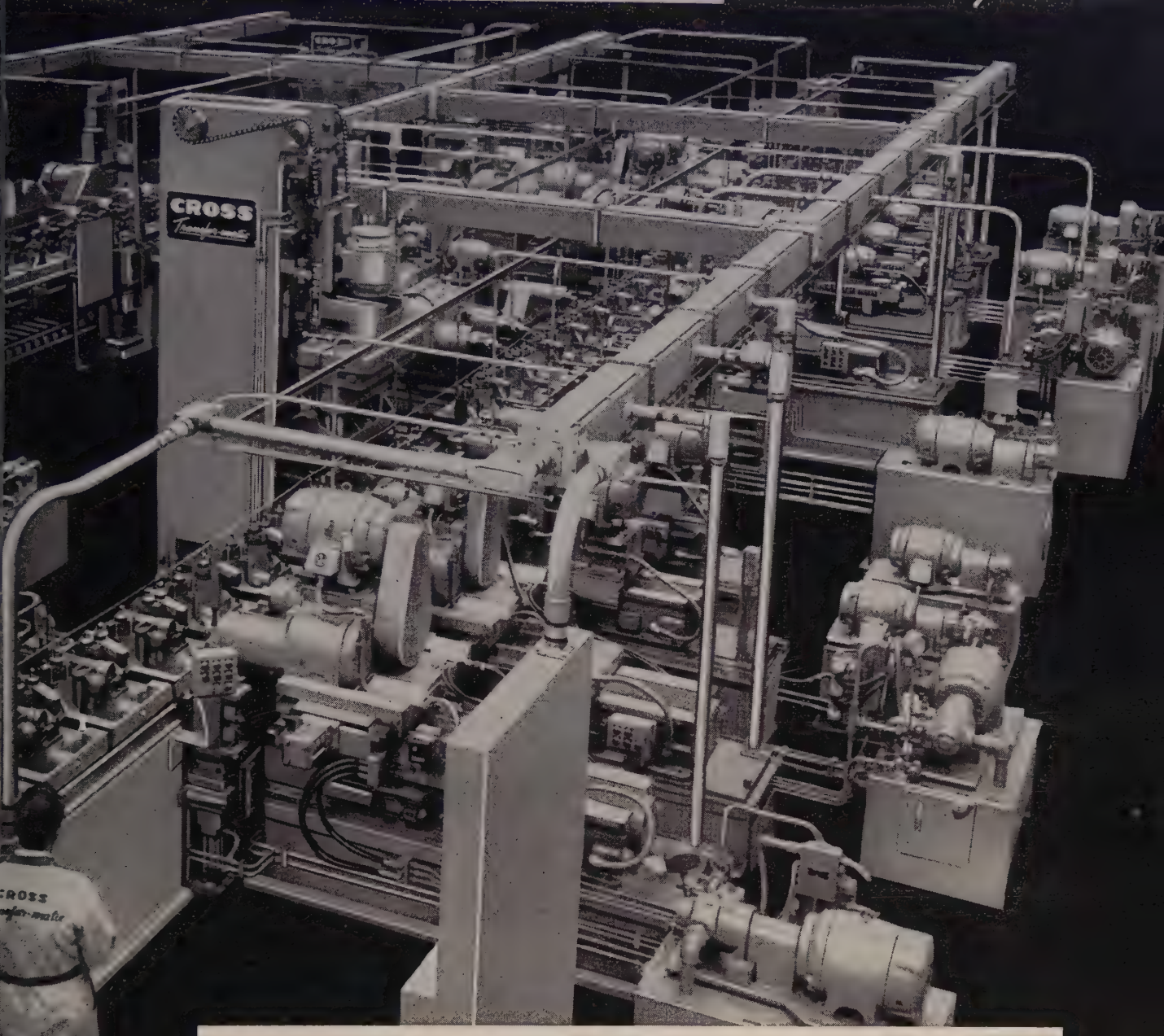
Established 1898

THE **CROSS** CO.

First in Automation

PARK GROVE STATION • DETROIT 5, MICHIGAN

Another Automation First by Cross



This Sectionized Transfer-matic completely machines hydraulic steering gear housings, except mounting holes which are processed in a preparatory operation. Rated capacity is 200 pieces per hour at 100% efficiency.

The housings are power clamped to pallet work holding fixtures which are transferred through three machine sections. In Section I, housings are milled, drilled, reamed, spotfaced, tapped and rough bored. Fixture clamps are then released to relieve machining strains. In Section II, single point precision boring completes the machining. Production is balanced by boring four parts simultaneously in each position. In Section III, air gages inspect the boring. Accumulating conveyors move the pallets between sections and provide banks of stock.

Three Cross Machine Control Units, with Toolometers to program tool changes, minimize downtime. Tool setting fixtures are provided to pre-set tools, thus eliminating trial cuts and adjustments.

Other features are complete interchangeability of all standard and special parts for easy maintenance, construction to JIC Standards, hardened and ground ways, and automatic lubrication.

LETTERS TO THE EDITORS

Wants Ways To Cut Costs

With today's economic pinch being experienced by most manufacturers throughout the country, we are all faced with the problem of cost reduction. It is our belief that in utilizing proper steel cutting techniques, Hunter Douglas can experience major savings in this area.

Do you have articles on steel cutting that define procedures and techniques directed toward the saving of time and material?

J. R. Eriser
Cost Improvement Co-ordinator
Hunter Douglas Aluminum Corp.
Riverside, Calif.

• *We are sending along a selection of articles in our Cost Crisis Series which tells about companies that have brought about important cost savings through more efficient use of capital equipment.*

How To Balance Inventories

Kindly forward six copies of the excellent article, "Are Your Inventories Right?" (June 2, Page 35).

George Nordstrom
Avildsen Tools & Machines Inc.
Chicago

Article Covers Helpful Points

We have reviewed your article, "These Devices Turn 'Tilts' into Dollars" (May 26, Page 104), and find that the points elaborated on have direct application in our work. We would appreciate six copies.

As manufacturers of heavy pressure vessels, we are constantly seeking to improve our fabrication techniques in the areas of setup, welding, and machining.

J. P. Wickel
Works Chief Industrial Engineer
Foster Wheeler Corp.
Mountaintop, Pa.

Comments on Foreign Pipe

Your article, "Inventories Force Slowdown" (May 26, Page 67), quotes a statement by a steel mill executive: "Major oil companies want pipe approved by the American Petroleum Institute. They wouldn't buy imported pipe unless they had money tied up in foreign countries."

As one of the major importers of oil country tubular goods and the sales agent

(Please turn to Page 12)

ATLANTIC LUBRICANTS

for every wheel that turns in industry

Wasting time and profits searching for the right gear oil for your machinery? Atlantic has the key to your problem, because our long experience has made us familiar with your lubricating needs. We've developed the products that can do any lubricating job to perfection . . . at low cost . . . for every wheel that turns in industry.

For further information on Atlantic's family of quality products for industrial lubrication and metal processing, write or wire The Atlantic Refining Company at the nearest office listed below.

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First and Penn Aves.

PITTSBURGH, PA.
Chamber of Commerce Building

In South America
Atlantic Refining Company of Brazil, Rio de Janeiro

LETTERS

(Concluded from Page 10)

for Phoenix-Rheinrohr Corp. of Germany, we feel it should be pointed out that practically all imported oil field pipe is made by API approved foreign mills, fully entitled to use the API monogram.

At present, the American Petroleum Institute lists 12 mills in England, Germany, France, Belgium, Italy, Japan, as being entitled to use the API emblem.

It should also be of interest that Moody Engineering Co., the principal inspection firm for oil country tubular goods, maintains its permanent staff in Europe as well as in Japan.

Oil country pipe shipped to offshore destinations is generally made to American Petroleum Institute standards, also, since this has become not only a national but an international standard of the oil industry.

K. Orban

Kurt Orban Co. Inc.
Jersey City, N. J.

Help in Negotiations

We would be pleased to receive six copies of the Program for Management article, "Building a Labor Contract" (May 19, Page 125). We expect this article to be of great assistance to us in forthcoming negotiations.

W. O. Clement

Industrial Relations Manager
Lenkurt Electric Co. of Canada Ltd.
Vancouver, B. C.

Latest News on Prices

We would like three copies of each of the five articles in the series on metalworking pricing prospects, the first of which, "Will Steel Prices Rise?" appeared in your May 12 issue (Page 45).

John M. Blair

Chief Economist
Subcommittee on Antitrust and Monopoly
Committee on the Judiciary
U. S. Senate
Washington

Government Aide Wants Article

I have read the excellent article, "Preview of Space Age Metals" (May 5, Page 86), and would appreciate receiving a copy. I feel it will be of valuable assistance.

Arnold C. Lewis

Military and AEC Liaison
Office of Defense Mobilization
Washington

Query on Brazing Technique

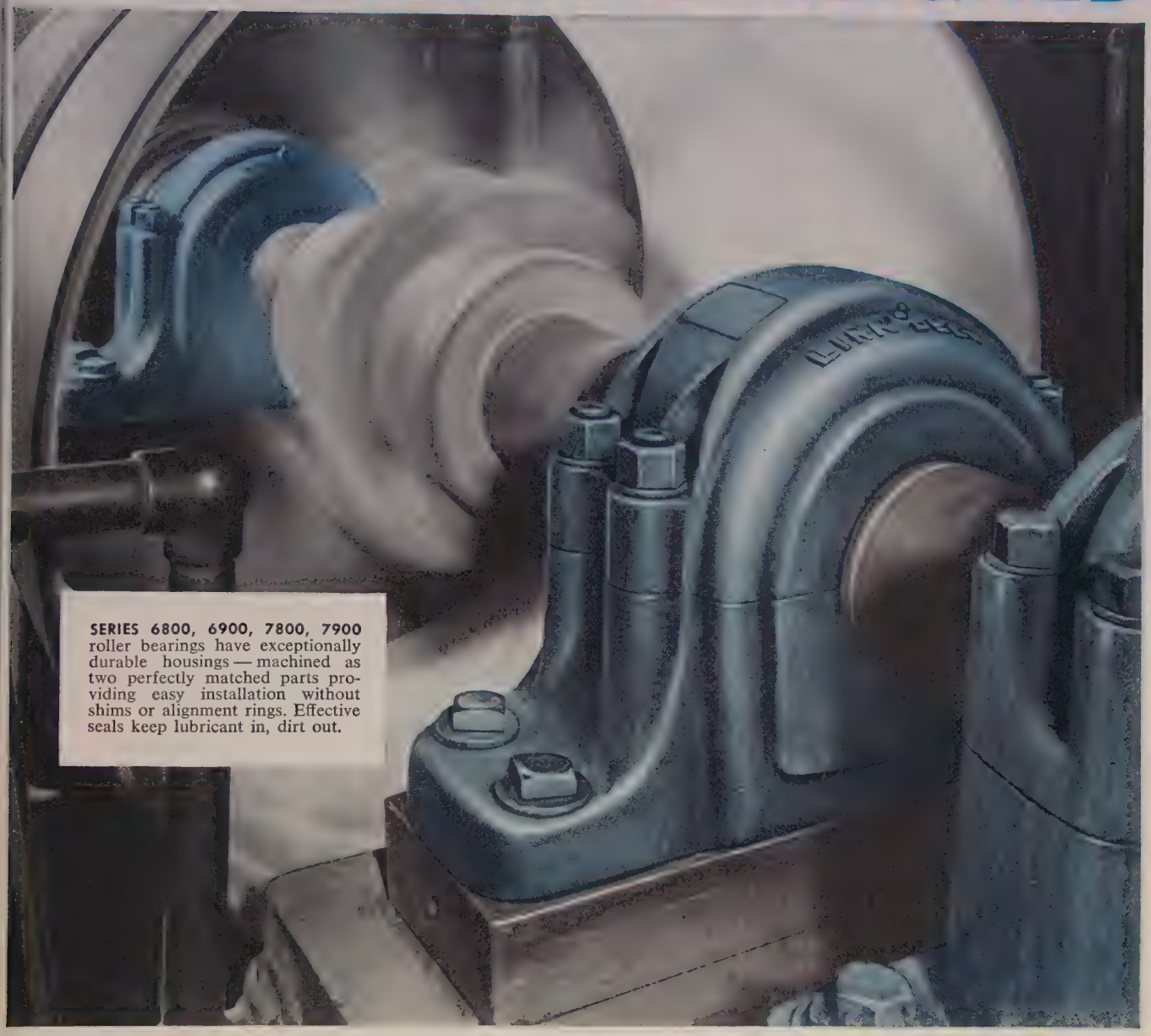
The item, "Aluminum-Stainless Bond" in your Technical Outlook column of May 12 (Page 85) is of particular interest to me. I would appreciate more information.

Anthony Rajskub

McGregor Mfg. Corp.
Birmingham, Mich.

• *Contact the Stewart-Warner Corp., 1826 Diversey Parkway, Chicago 14, Ill.*

NO PINCH, NO BIND-- ALWAYS-ALIGNED

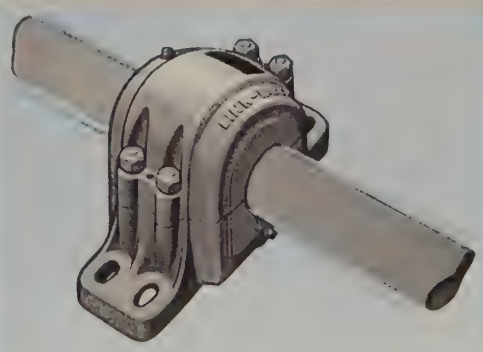


SERIES 6800, 6900, 7800, 7900 roller bearings have exceptionally durable housings — machined as two perfectly matched parts providing easy installation without shims or alignment rings. Effective seals keep lubricant in, dirt out.

These husky bearings in husky housings adjust *instantly* to shaft misalignment

Shaft deflection often means quick failure for ordinary bearings . . . but not for these rugged Link-Belt *self-aligning* bearings. Adjusting immediately in any direction, they easily compensate for misalignment . . . avoid damaging "pinch" and bind.

You can get full information on Link-Belt's complete bearing line from any one of 40 Link-Belt offices. Or contact your authorized stock-carrying distributor.



Spherical bearings are free to align in any direction, assuring full load capacity regardless of shaft deflection.

LINK-BELT

MANUFACTURERS OF SELF-ALIGNING BALL AND ROLLER BEARINGS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 14.905


BAUSCH & LOMB
OR-25
Direct scale reading to .0001" . .
only
$695
COMPLETE

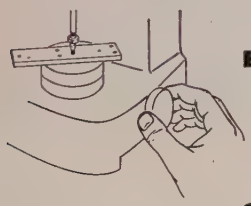
New!

BAUSCH & LOMB DR-25 OPTICAL GAGE

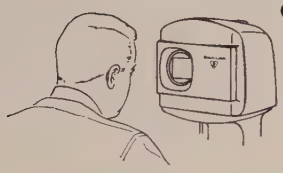
.... 0" to 3" range ... accurate to .000025"!

FAST, EASY AS A-B-C!

A Just set part to be measured on anvil ... no masters or set gages needed.



B Turn knob to lower spindle ... it will stop automatically on contact, with constant spindle pressure.



C See precise measurement at a glance ... direct-reading scale is illuminated, magnified. No eyestrain, no conversion, no guesswork.

DEPENDABLE ACCURACY!

Direct readings to .0001"; keeps production to quality specification. Master scale ruled on world-famous B&L Grating Ruling Engine. Every DR-25 Optical Gage is accurate to 0.000025".

PRACTICAL, ALL-PURPOSE!

Direct scale measurement of depth, thickness, height, diameter, taper, angularity of surfaces, runout. Large work table makes it easy to adapt special fixtures. Deep (4¼") throat, open sides and large staging area accommodate widest variety of work.

ON-THE-JOB DEMONSTRATION!
NO OBLIGATION...
JUST MAIL COUPON TODAY!

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☐ Please send Catalog D-285.

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Photo taken at Continental Can Company's Chicago Laboratory

Republic's fabricating "Know How" helps Continental Can Company

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The customer wanted rack-type shelving with sliding shelves that could be quickly and easily adjusted to accommodate a variety of can sizes and types, yet still weather the severe changes in temperature. Republic's Berger Division took over the problem, came up with the solution. Through its contract manufacturing facilities and equipment, Berger took the whole job off the customer's hands.

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Berger's large stocks of standard tools, dies, and specialized equipment for punching, shearing, forming, welding, and Bonderizing are available to you. Constant research and development at Berger have resulted in advanced processes and equipment to make your fabricated sheet steel products more attractive, and more economical.

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Send a sketch or blueprint with complete specifications. Berger will tell you promptly what their specialized services can do for you. Detailed information is available in Bulletin 1090.

REPUBLIC FILING CABINETS are available in a wide range of styles and sizes to meet any office filing requirement. Drawers coast on cradle-type progressive ball-bearing suspension slides. All steel construction withstands exceptionally hard use. See your dealer—or send coupon today.

SOLVE THE PROBLEM of storing heavy items with Republic Wedge-Lock Steel Shelving. It is specifically designed for high stacking of enormous weights. The joints actually get tighter as more weight is added. Wedge-Lock Steel Shelving provides maximum loading in minimum floor space. Shelves can be easily adjusted — whole units can be converted or combined to suit changing needs. It can be easily and quickly assembled. Send coupon for full information.

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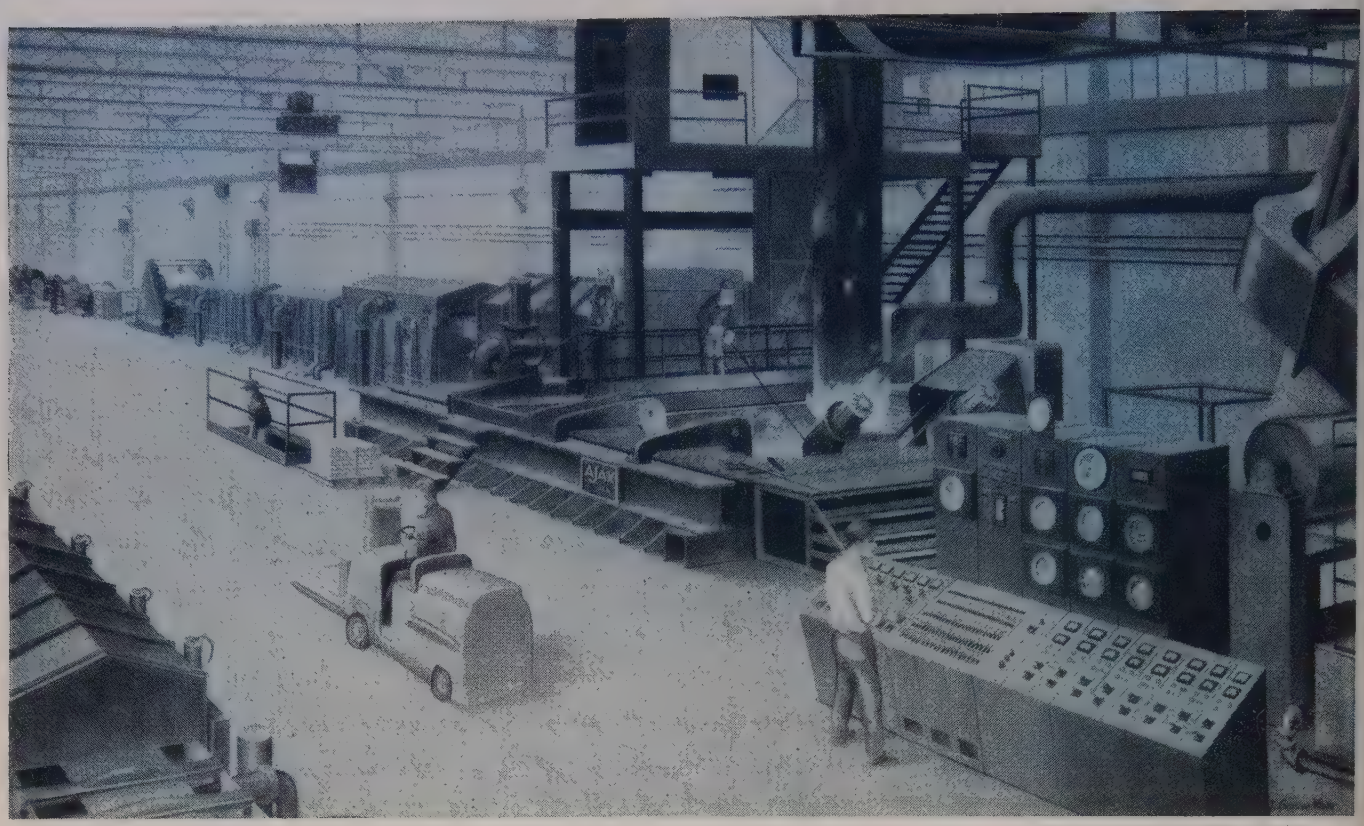

The above is a partial view of the two continuous galvanizing lines at the Martins Ferry, Ohio, plant of WHEELING STEEL CORPORATION. Both lines use AJAX 60 cycle induction galvanizing furnaces and zinc premelt furnaces. The main galvanizing furnace shown holds 175 tons of zinc, is rated 2000 kw, and produces over 40 tons per hour at speeds in excess of 300 feet per minute. These continuous galvanizing lines produce WHEELING's patented SOFTITE sheet.

60 Cycle induction galvanizing

has progressed from small beginnings a few years ago to a

present capacity of well over **one million tons per year.**

Here is an entirely new approach to an old art:

1. A refractory lined hearth in place of the iron kettle eliminates kettle replacement and iron pickup, drastically reduces dross formation.
2. Temperature control is precise, lag free, holds the melt at ideal galvanizing temperature at all times.
3. Gentle electromagnetic circulation facilitates alloy additions, keeps alloy uniform throughout the melt.
4. Clean and cool working conditions for hand dipping or continuous operations.

All these factors help to produce a galvanized coating of consistent superior quality and to attain high production at lowest unit costs.

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ENGINEERING CORPORATION

TRENTON 7, NEW JERSEY

60 CYCLE INDUCTION MELTING

Associated Companies: Ajax Electrothermic Corporation — Ajax Electric Company

News!

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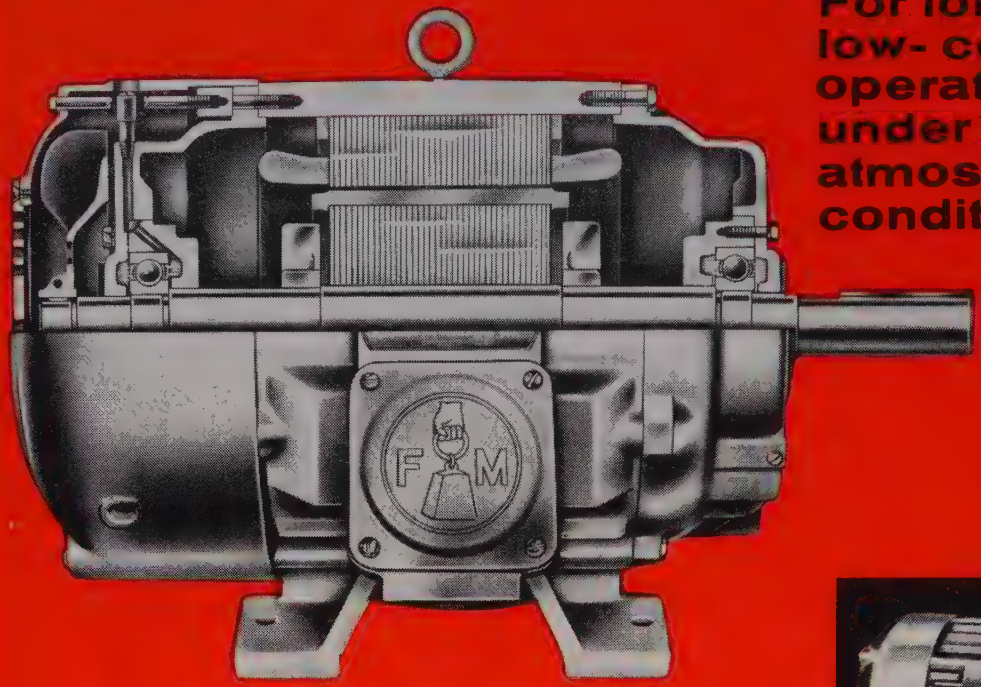

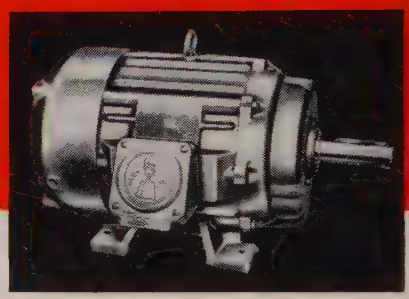

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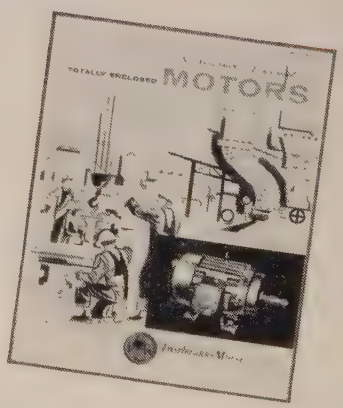
New Fairbanks-Morse design confines air stream to surface of motor—provides extremely efficient cooling, prevents dust and dirt accumulation. Combines advanced design innovations with long-proven F-M features.

See why these all-new F-M motors warrant your investigation *now* for severe service involving dirt, dust, metal turnings, or abrasive particles; corrosive vapors, steam, excessive moisture, etc.

Write today for new Bulletin 1205, giving complete information on new F-M Totally-Enclosed Fan-Cooled (Type KZC, in larger frames) and Non-Ventilated Motors (Type KZE, in smaller ratings). Fairbanks, Morse & Co., 600 So. Michigan Ave., Chicago 5, Ill.



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OF MEETINGS

June 21-24, Alloy Casting Institute: Annual meeting, Homestead, Hot Springs, Va. Institute's address: 286 Old Country Rd., Mineola, N. Y. Executive vice president: E. A. Schoefer.

June 22-27, American Society for Testing Materials: Annual meeting and exhibit, Statler-Hilton Hotel, Boston. Society's address: 1916 Race St., Philadelphia 3, Pa. Executive secretary: Robert J. Painter.

June 23-27, American Institute of Electrical Engineers: Summer general meeting, Hotel Statler-Hilton, Buffalo. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

June 24-26, American Marketing Association: National conference, Harvard Graduate School of Business, Boston. Association's address: 27 E. Monroe St., Chicago 3, Ill. Secretary: Schuyler F. Otteson.

July 14-16, Truck-Trailer Manufacturers Association: Summer meeting, Homestead, Hot Springs, Va. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

July 23-26, National Tool & Die Manufacturers Association: Summer board meeting, Mt. Washington Hotel, Bretton Woods, N. H. Association's address: 907 Public Square Bldg., Cleveland 13, Ohio. Executive vice president: George S. Eaton.

Aug. 11-14, Society of Automotive Engineers: National west coast meeting, Ambassador Hotel, Los Angeles. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Aug. 19-22, American Institute of Electrical Engineers: Pacific general meeting, Hotel Senator, Sacramento, Calif. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Aug. 19-22, Western Electronic Show & Convention: Pan-Pacific Auditorium, Los Angeles. Information: WESCON, 1435 S. LaCienega Blvd., Los Angeles 35, Calif.

Sept. 7-12, American Chemical Society: National chemical exposition and conference, International Amphitheatre, Chicago. Society's address: 1155 16th St. N. W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Sept. 8-11, Society of Automotive Engineers: Farm, construction, and industrial machinery meeting, production forum, and engineering display, Milwaukee Auditorium, Milwaukee. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

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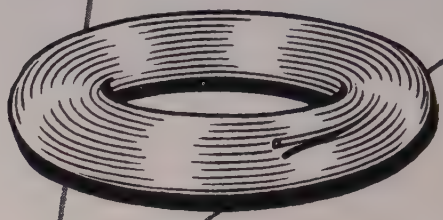
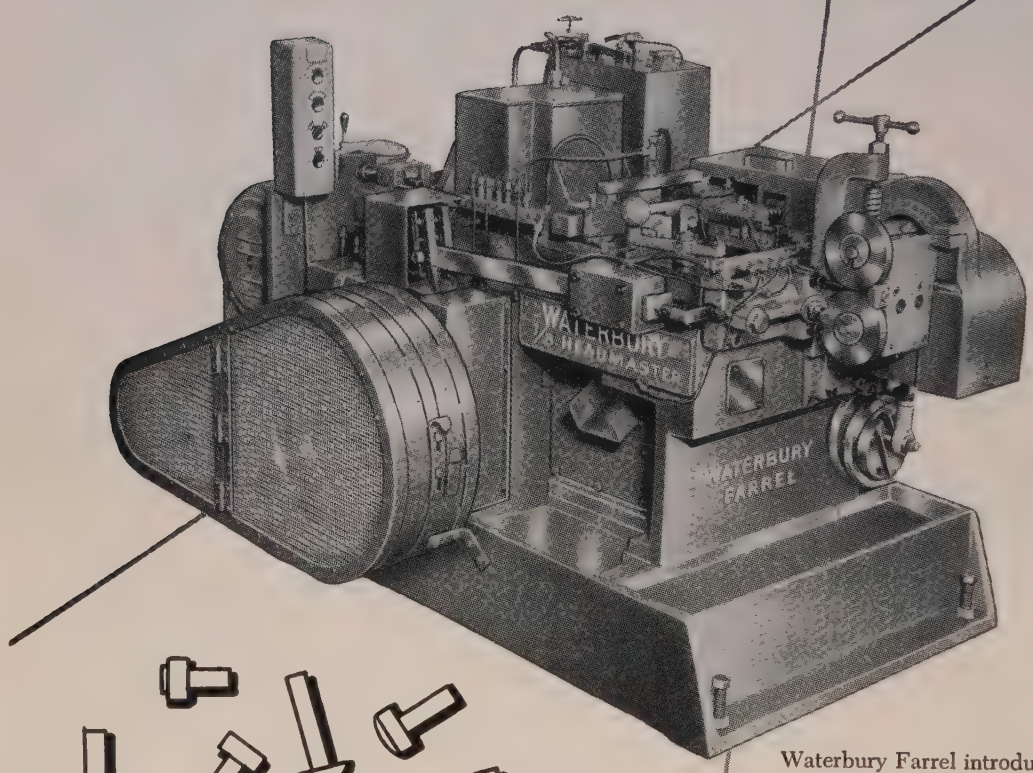
Heads 300 To 450 Screw Or Rivet Blanks Per Min.





Waterbury Farrel introduces a revolutionary new concept in cold heading speeds... proven by actual production runs to be the world's fastest rates achieved by a solid die double stroke header.

Operating at speeds from 300 to 450 blanks per minute, the machine will head rivets up to ⅜" x ¾, machine screws up to #6 x ¾, and sheet metal screws up to #8 x ¾.

Write today for further information on Waterbury Farrel's "HEADMASTER."

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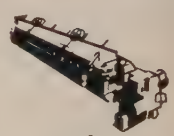
Wire Mill Equipment


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WATERBURY FARREL FOUNDED 1851

WF-33

South cantilever section and part of suspended span erected; work begun on north tower seen in background. Total length of new bridge is 3350 feet, four lanes wide. Designer: California Division of Highways. Fabricators and Erectors: American Bridge Division, United States Steel.

Going up:

The bridge in which USS "T-1" Steel saved $800,000

The Carquinez Strait Bridge is the first major bridge use of USS "T-1" Constructional Alloy Steel, the first large bridge in which all truss members were fabricated by welding, and unique in that the specification of an alloy steel saved $800,000 in construction costs alone.

Like its 31-year-old counterpart, it will connect the San Francisco Bay area with the Sacramento Valley. In profile, the two bridges look like twins, but are vastly different in construction. First, to build the wider, heavier bridge without exceptionally massive members, a weldable, tremendously strong steel was needed. USS "T-1" Steel's yield strength (100,000 psi minimum), combined with its weldability, filled the bill—cutting weight of some members by nearly one-half their equivalent A242 design, and saving $800,000.

Second, welded construction in the new bridge will greatly minimize maintenance expense. It costs about $70,000 yearly to clean and paint the old bridge. By getting rid of thousands of vulnerable rivet heads, edges, lacing bars and angles in the new bridge, members will be less susceptible to corrosion and far easier to maintain and paint.

All in all, 2910 tons of "T-1" Steel are used in the bridge's most heavily stressed members. Also used: 5370 tons of USS TRI-TEN Steel, a weldable high-strength low-alloy steel, and 6440 tons of structural carbon steel. Each of these steels—all available from United States Steel—plays an important role in the bridge, helping to make possible the "most bridge for the money."

For more information. Write for our comprehensive books entitled "T-1" and "TRI-TEN." You'll find in them a wealth of engineering and metallurgical data. Or, contact our nearest representative—you'll find him listed in the telephone directory. United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

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USS United States Steel

Father and son total 70 years machining steel

At the U. S. Steel Homestead Forge Shop, you find a lot of men who carry on in the shoes of their fathers. Gus Seitz's father was a Journeyman Machinist for 30 years before he retired. Gus started in the shop when he was 16, worked as an apprentice, Journeyman Machinist, Inspector. After six years in Production Control, he moved up to General Foreman, a post he has held for 10 years. With 40 years of machining experience behind him, Gus supervises a staff of 256.

His most important job: see that the work is carried out to the customer's specifications, *on time.*

The forgings in the picture illustrate some of the scheduling problems that Gus has to solve. These are closure head flanges for a nuclear reactor—130″ OD, 88″ ID and 35″ high. Ingots were cogged, upset, punched and forged over a mandrel. Then they received the preliminary machining. Next came a quench-and-temper heat treatment to meet the physical properties needed by the reactor builder. Then followed about 10 days of testing for microstructure, tensile strength and ductility. Finally, the forgings were scheduled back onto the 20-foot vertical boring mill for final machining.

With men like Gus Seitz riding herd on your USS Quality Forging order, you can rest assured that money won't buy a better piece of steel. U. S. Steel has the men, the know-how, the equipment and steel to turn out forgings for the most critical service, and we're eager to help you solve your forgings problems. Write for our free 32-page booklet on USS Quality Forgings. Send your requests to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

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"eliminates inventory losses"

reported by **Claude M. Turner,** Purchasing Agent
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"Carrying large in-plant stocks of stainless steel plates is quite risky, since specifications change rapidly, especially in the missile field. An unexpected requirement change might leave us with a costly inventory of dead stock.

"However, by using U. S. Steel Supply's Any Steel, Anywhere, Any Time Service, we have eliminated this dangerous possibility. We know from experience, that, regardless of quantity or demand, U. S. Steel Supply can deliver just the material we need . . . when we need it."

Here's how this service can work for you!

If you would like to see how other steel users are saving money and increasing profits as a result of Any Steel, Anywhere, Any Time Service, write to U. S. Steel Supply at the address below. There's a good chance our representative can help *you* eliminate idle equipment, increase production, and cut inventory costs.

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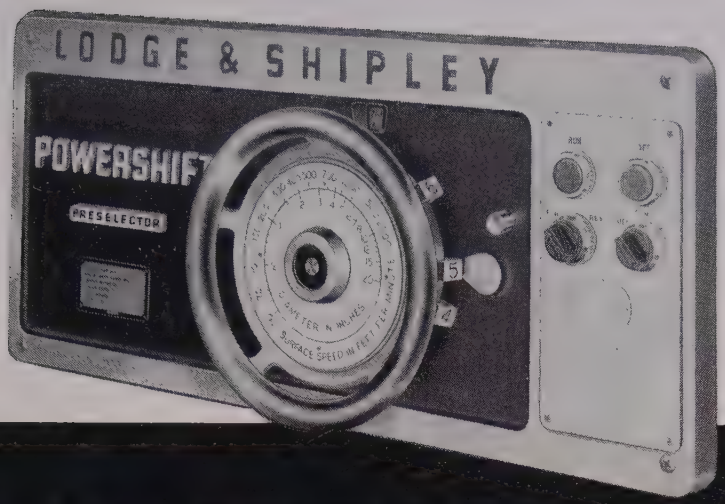

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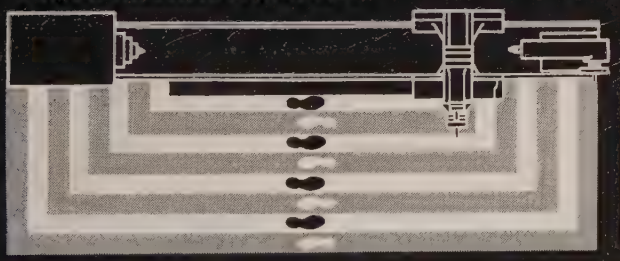
CONVENTIONAL HEADSTOCK . . .
4 trips to headstock . . . 4 to apron



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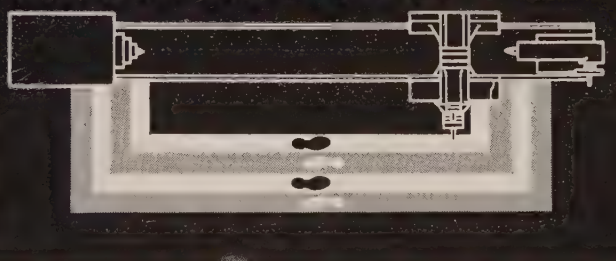
only 2 trips to headstock . . . only 2 to apron!



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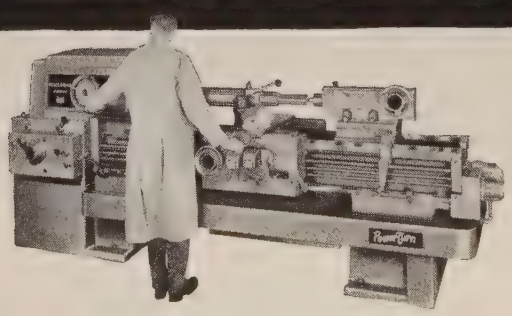

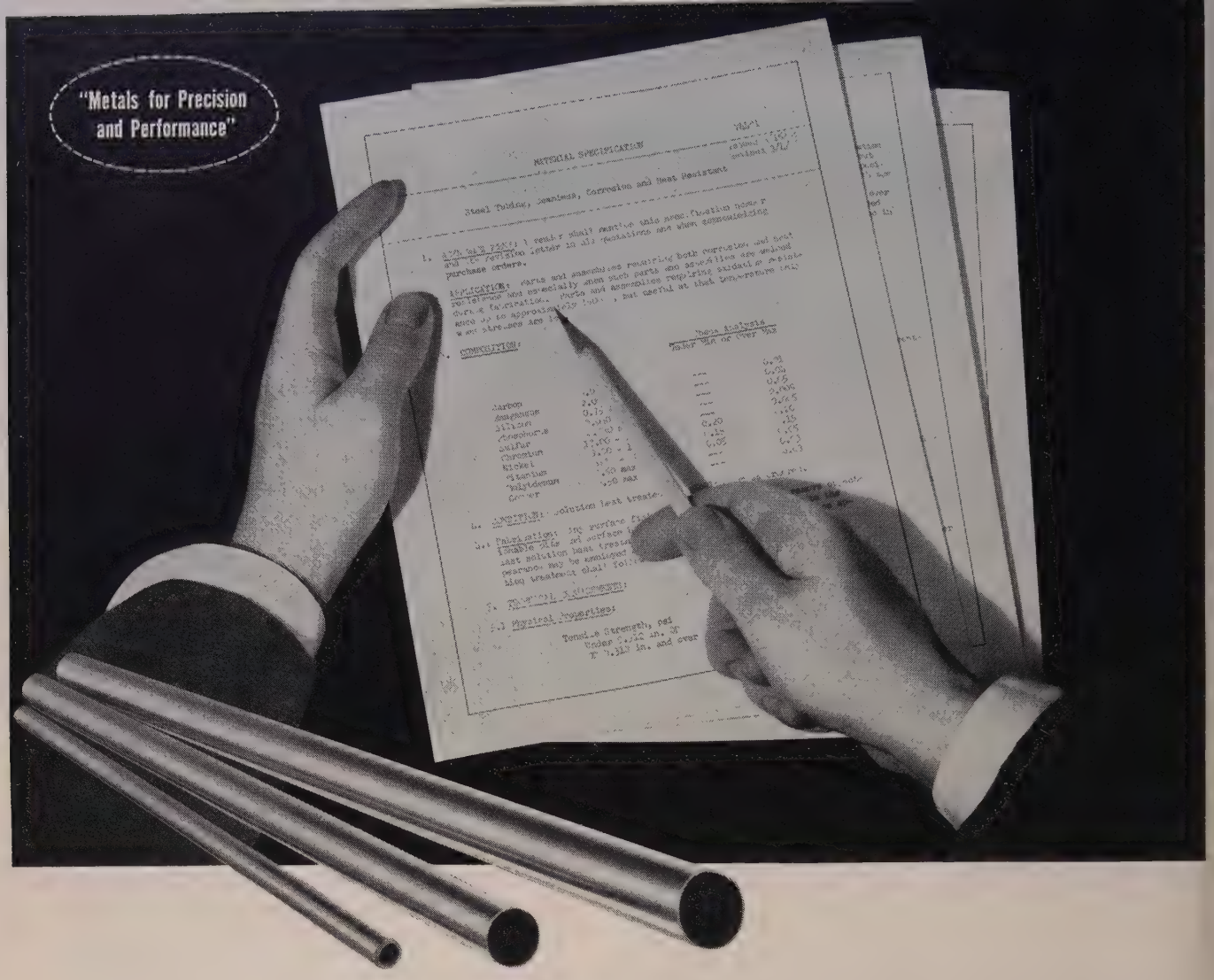

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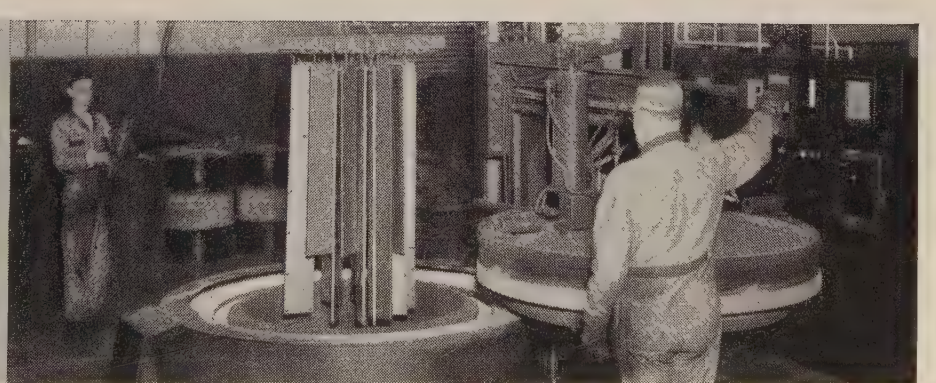
Gas-Fired Homocarb® Furnace Installed

"This equipment took a sizable bite out of our limited expansion capital," says Carl H. Muehlemeyer, President of O. T. Muehlemeyer Heat Treating Company, commercial heat treaters in Rockford, Ill., "but we chose it deliberately after much consideration because we know that with it, we can give our customers the quality and service they require at a competitive cost."

Muehlemeyer points out that, "This furnace is part of a quality-control expansion program extending over the next several years. It reached us from Leeds & Northrup ready for installation with complete instrumentation for Speedomax temperature control and Microcarb atmosphere control."

Only recently has a complete line of gas-fired Homocarb furnaces, equivalent in design, construction and instrumentation to electrically-fired units been introduced. Combining precision control of carbon potential with the economy of gas-firing, these furnaces can be used interchangeably for case carburizing, carbon restoration, homogeneous carburizing or hardening. These factors strongly influenced Muehlemeyer's choice.

A load of SAE 4140 steel slidebars being unloaded from Muehlemeyer's gas-fired furnace. Carbon and temperature control panels can be seen at right. Above is the same furnace . . . measuring 15 feet high by 6½ feet in diameter . . . ready to leave the L&N shipping dock in Philadelphia.



For more information *just write us at 4957 Stenton Ave., Phila. 44, Pa.*

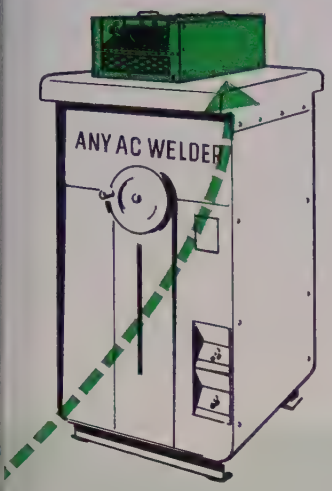
LEEDS NORTHRUP
instruments *automatic controls • furnaces*

Convert any* a-c welder

New A. O. Smith convertor units give any shop more versatility

Compact 250-amp and 450-amp units sit on top of any a-c welder.

to d-c in 60 seconds!



New way to up flexibility

Now, with either of two A. O. Smith convertor units, *any* a-c welder in your plant can be quickly converted to all of your d-c welding needs.

Either of these two new A. O. Smith convertors can be used with *any manufacturer's a-c welder of any amperage!*

And, as indicated below, you can hook up these convertors in a matter of seconds — for temporary, intermittent or permanent operation.

No matter which make a-c welder you currently use, here are advantages A. O. Smith convertors offer—

- Complete polarity switch permits fingertip selection of d-c straight, d-c reverse or a-c current without touching leads.
- 250-amp unit is rated at 60% duty cycle or 300-amps at 40% duty cycle. 450-amp unit is rated at 60% duty cycle or 500-amps at 45% duty cycle.
- Completely self-contained — not special kits designed for specific welders.
- Easily portable — can be kept in the tool crib . . . quickly delivered wherever needed.
- 60-second hook-up — two cable connections to welder output, two connections to the work.
- Internal overload protection.
- Smoothing reactor to keep ripple low, arc stable.
- Blower-cooled for maximum cooling, quiet operation.
- Long-life *silicon* rectifiers.

If you don't have an a-c welder, you're missing a lot in welding flexibility. It's time to check the line of A. O. Smith a-c welding machines: 180-1500 amps.

Through research A.O. Smith *. . . a better way*

A.O.Smith
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WELDING PRODUCTS DIVISION
Milwaukee 1, Wisconsin
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ALLIS-CHALMERS

Products for steel: motors, m-g sets, rectifiers, control, pumps, *Texrope* drive equipment, crushers, grinding mills, screens, transformers, unit substations, switchgear, circuit breakers, turbine-generators, voltage regulators, blowers, compressors, condensers, and water conditioning equipment.

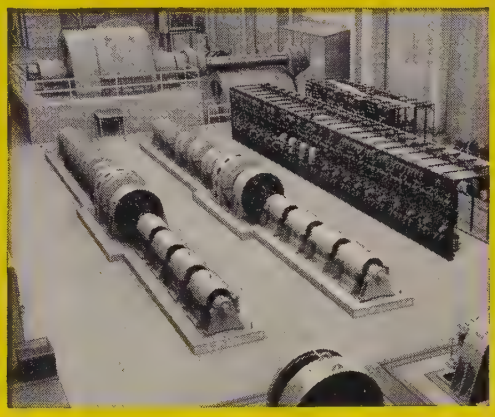
ALLIS

in Step with STEEL

The blooming mill

Maximum electrical efficiency is assured in blooming mill operations where Allis-Chalmers equipment is used. From switchgear to drive motors, Allis-Chalmers offers a tailored system — engineered by mill experts and designed to keep high quality blooms rolling fast and accurately.

From mine to final processing—Allis-Chalmers equipment is in step with the increasing tempo of expanding steel production. Contact the nearest A-C office in your district, or write Allis-Chalmers, Milwaukee 1, Wisconsin.



Blooming mill motor room view shows components of the Allis-Chalmers electrical package. Switchgear, control, constant and variable voltage motor-generator sets, *Regulex* motor-generator sets, liquid rheostat, and twin drive motors are designed to work together for peak mill output.

Regulex and *Texrope* are Allis-Chalmers trademarks.

CHALMERS

A-C ALLIS-CHALMERS

A-5411

MAKE VERSON FABRICATING FACILITIES A PART OF YOUR OWN

The TRADE Verson MARK Contract Fabricating Division . . .

At your service for Weldments and Steel Plate Work

Verson offers complete, modern facilities for all your steel plate fabricating requirements. An efficiently laid out 55,000 sq. ft. building with 170 tons of crane and hoist capacity houses steel plate storage, flame cutting, welding, stress relieving and shot blasting facilities. A 1000 ton press brake is available for forming and straightening plates. Welding positioners handle up to 40,000 pounds.

These facilities are at your service for prompt, economical fabricating. For quotations, send an outline of your requirements.

Contract Machining and Gear Cutting

Verson's Contract Machining Division offers complete machining and gear cutting services for requirements beyond the capacity of your equipment. Write for further details or send an outline of your needs.

A Verson Press for every job from 60 tons up.

190

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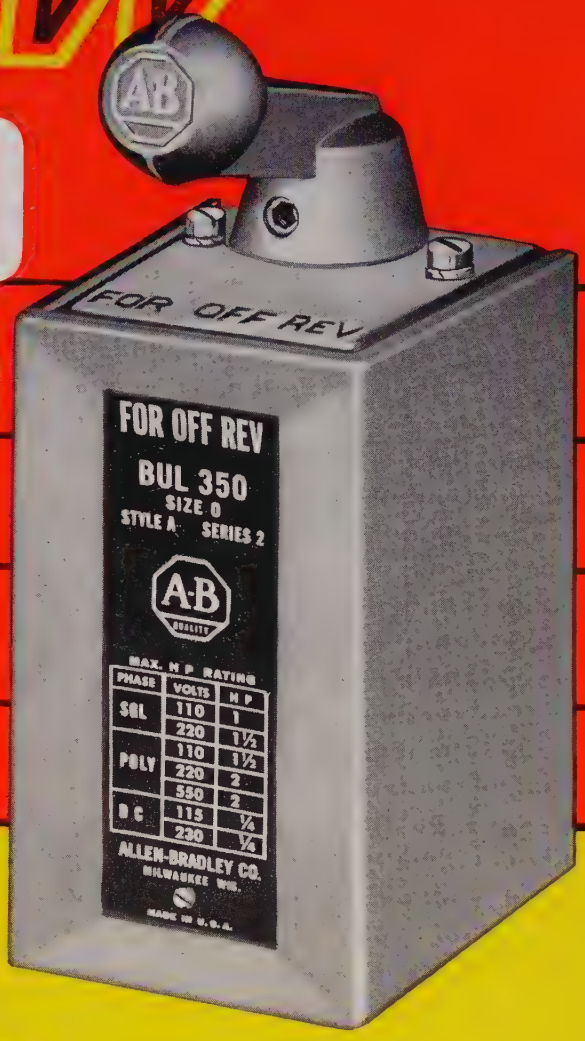
ALLEN-BRADLEY

new

BULLETIN 350 reversing drum switch



Styled by Brooks Stevens, internationally famous industrial designer.

- *MODERN IN APPEARANCE*
- *AVAILABLE AS OILTIGHT—FOR CAVITY MOUNTING*
- *EASY TO MOUNT*
- *EASIER TO WIRE*
- *INSTANT CHANGEOVER FROM MAINTAINED TO MOMENTARY CONTACTS*

A-B QUALITY

ALLEN-BRADLEY

MOTOR CONTROL

QUALITY

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
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6-58-MR

A new "quality" standard for small REVERSING DRUM SWITCHES

A-B QUALITY

GOOD-LOOKING AND GOOD "FEELING" DIE CAST HANDLE

EASILY ACCESSIBLE MOUNTING HOLES

MERELY LOOSEN SCREW AND SLIDE PLATE to change from momentary to maintained contacts —or vice versa

INDEPENDENT SWITCH MOUNTING prevents misalignment

HEAVY CONTACT SURFACES for long operating life

TWO CONDUIT OPENINGS

WRAP-AROUND COVER gives complete access to drum

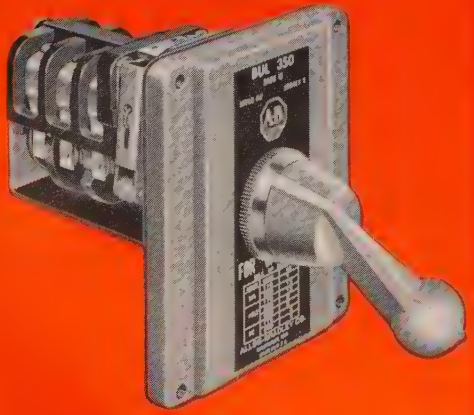
SINGLE SCREW COVER MOUNTING —screw cannot fall out

ACCESSIBLE SCREW TERMINALS for front wiring

RAISED EDGE for base mounting without spacers

maximum rating 2 horsepower

NEW OILTIGHT COVER PLATE FOR CAVITY MOUNTING



Bulletin 350 Reversing Switch can be furnished with oiltight cover plate with rubber gasket seal for cavity mounting in a machine base.

This *all-new* Allen-Bradley reversing drum switch was designed to keep pace with the mechanical beauty designed into so many of the modern machine tools.

The Bulletin 350 reversing switch is equivalent to a three-pole, double throw switch . . . and can be used with d-c motors; or single phase, two phase, or three phase a-c motors.

Investigate the Bulletin 350 . . . the *new leader* of its class . . . in appearance, ease of installation, and operating life. An Allen-Bradley *quality* switch . . . in every sense of the word. Send for descriptive bulletin.

ALLEN-BRADLEY

MOTOR CONTROL

QUALITY

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.
In Canada—Allen-Bradley Canada Ltd., Galt, Ont.

6-58-MR

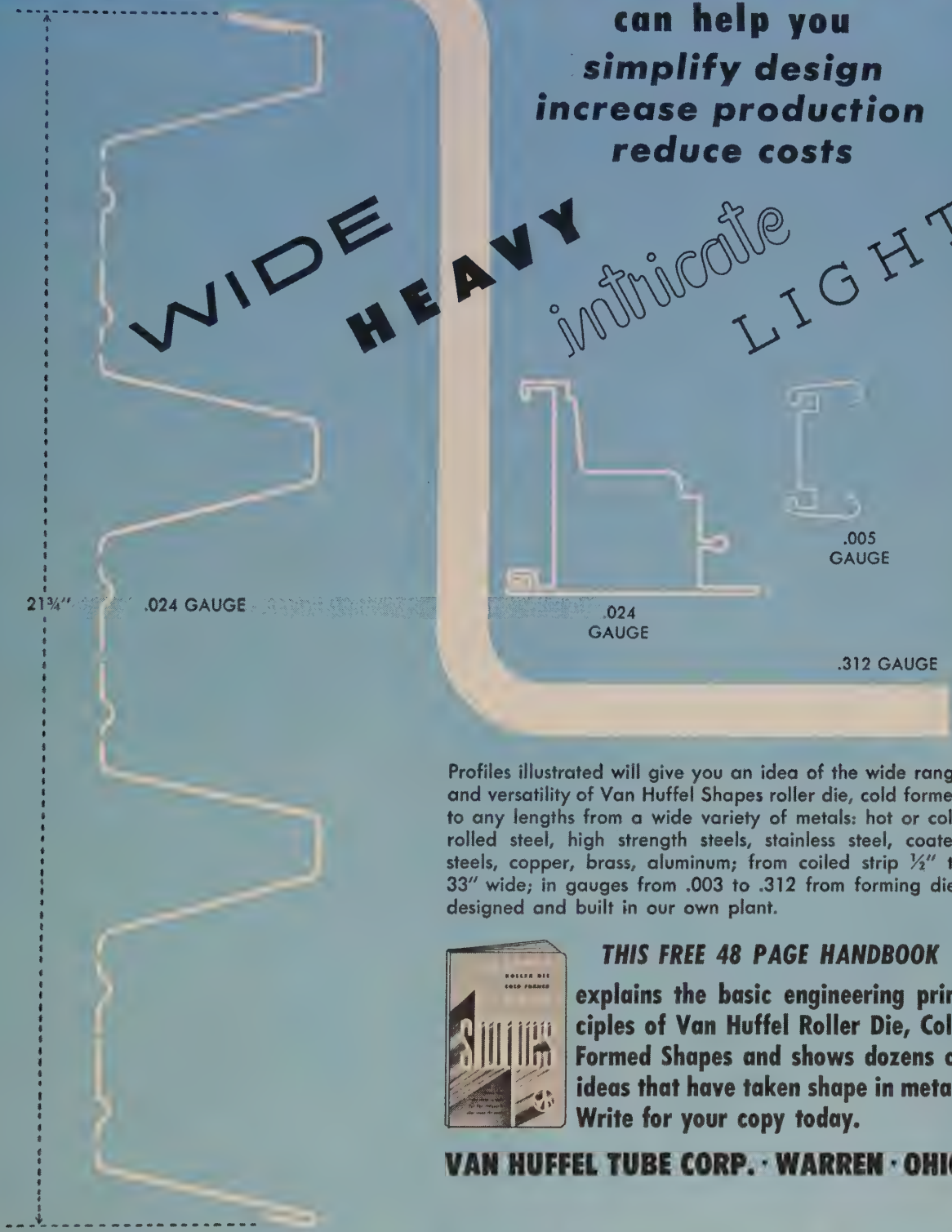
van huffel

ROLLER DIE COLD FORMED

metal shapes

can help you
simplify design
increase production
reduce costs

WIDE HEAVY intricate LIGHT



Profiles illustrated will give you an idea of the wide range and versatility of Van Huffel Shapes roller die, cold formed to any lengths from a wide variety of metals: hot or cold rolled steel, high strength steels, stainless steel, coated steels, copper, brass, aluminum; from coiled strip ½" to 33" wide; in gauges from .003 to .312 from forming dies designed and built in our own plant.

THIS FREE 48 PAGE HANDBOOK

explains the basic engineering principles of Van Huffel Roller Die, Cold Formed Shapes and shows dozens of ideas that have taken shape in metal. Write for your copy today.

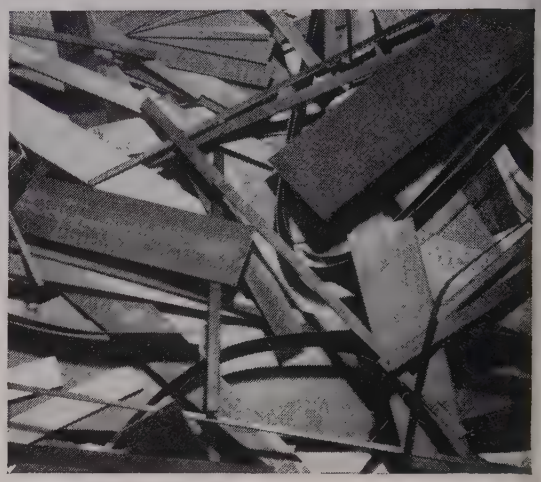
VAN HUFFEL TUBE CORP. · WARREN · OHIO

where ideas take shape in metal

Cut sheet steel costs with Ryerson service

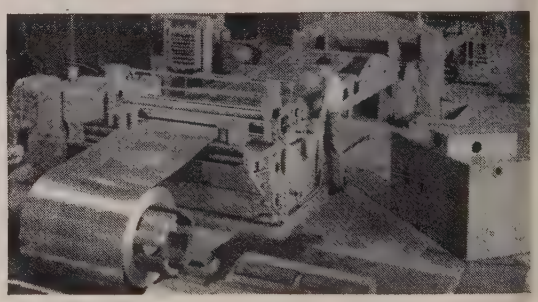
Cut inventory costs

No need to tie up capital in inventories—and valuable shop space—when you can get immediate delivery of your requirements, large or small, from large and complete stocks at your nearby Ryerson plant.



Cut scrap losses

Why pay sheet steel prices for scrap like this? When your size can be furnished from standard-width coils, Ryerson cut-to-length service gives you the important savings of a net weight price—eliminating scrap costs. In addition, mill-type slitters enable Ryerson to furnish any width requirement.



Cut fabrication costs

Ryerson stocks of hot and cold rolled sheets are quality-controlled to .10 maximum carbon content (SAE 1008). This means you can minimize, or even eliminate, the problems of variations in forming and welding quality caused by the average wide range of carbon content.

Ryerson service delivers your order tightly banded, skidded with sound lumber, to further cut your labor costs, add protection to the steel and make handling far easier.

RYERSON CERTIFIED QUALITY

RYERSON STEEL®

Member of the INLAND Steel Family

***Principal Products:** Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing—aluminum, industrial plastics, metalworking machinery, etc.*

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI • CLEVELAND DETROIT • PITTSBURGH • BUFFALO • INDIANAPOLIS • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

Metalworking Outlook

Chicago Buyers See Upturn

Business will be better in the second half than in the first, report 65 per cent of the respondents to a survey by the Purchasing Agents Association of Chicago. Only 7 per cent expected volume to decline for their companies, while 28 per cent believe levels will stay the same. Despite the optimism, Chicago area buyers say stringent inventory control is still the rule.

Utilities To Double Spending?

Privately owned electric utilities will have to spend $40 billion for new plants from now through 1965. So says Lloyd D. Brace, president of the First National Bank of Boston, who points out that such a rate would be twice as fast as the spending from 1948 through 1957. Mr. Brace bases his figures on his expectation that we'll need 160 million kw of capacity by the end of 1965. We have 135 million kw in place today.

Soft Coal Output To Drop, Then Rise

Look for bituminous coal production to hit 426.5 million tons this year, compared with 490 million tons last year. Prospects are for improvement in 1959, to 480 million tons, predicts V. M. Johnston of Appalachian Coals Inc. Electric utilities will continue as the major consumers.

Steel Capacity by 1970

America's steel industry will need a capacity of about 200 million tons by 1970, predicts Prof. Donald R. G. Cowan of the University of Michigan. That will be some 43 per cent higher than our current capacity. Total volume of goods and services produced will have to increase more by 1970, he says—by 55 to 65 per cent. Steel will need to expand less than the general economy because of its substantial capacity increases of the last few years.

Steelworkers Go to Polls

Keep your eye on United Steel Worker local elections late this month and early next. The outcome will indicate how secure President David McDonald and his regime are. His re-election to a four-year term in February, 1957, was surprisingly close, indicating he had a lot of fence-mending to do. The upcoming local elections will show how well or badly he has done the job. If he didn't do well, he'll have a rough time with the delegates at the union's Sept. 15-19 convention in Atlantic City, N. J. For the long term, anti-McDonald forces in control of many locals will pose problems for top company as well as union executives. Examples: Will wildcat strikes be more common? Will locals abide by McDonald-negotiated contracts? Will the USW president have his customary free hand in 1959 negotiations? The most anti-McDonald sentiment shows in Lorain, Ohio, and Monessen-Donora, Pa.

Hourly Steel Pay Climbs

The average hourly payroll for steelmaking employees in April was a record $3.108, compared with $3.092 in March and $2.837 in April, 1957. Major

reasons for the rise: In tougher times, productivity improves and workers on incentives make more money per hour; layoffs have been concentrated among the lower paid workers. The April figure of $3.108 doesn't include costs of pensions, social security, insurance, and SUB which average more than 30 cents an hour, estimates the American Iron & Steel Institute. Wage earners worked an average of 33.1 hours per week during April, against 33.6 hours weekly in March.

Pay Boosts: Less Than 2 Per Cent?

"Any general pay increase of much more than 2 per cent compounded annually is bound to be inflationary—even if the pay pattern setters offering any such increase might have productivity advances far beyond the average for the economy." That's the conclusion of General Electric Co. which shows that in the last 48 years the average annual increase in real private product per manhour (productivity) has been 2.1 per cent. In GE's own case, its cost-of-living pay adjustments since 1955 have added a total of 7 per cent to the automatic wage adjustment of 3 per cent compounded annually—making a total of more than 16 per cent in two and a half years, not counting the added costs of pensions, insurance, and other benefits. GE's conclusion: No wonder we have inflation.

The Right-To-Work Campaign

Eight states may vote on right-to-work laws this year. Another 18 already have legislation that bans the union or closed shop. Kansas, Ohio, California, Colorado, Idaho, Montana, Washington, and Nevada will probably vote this fall. Ohio and California will see the most important contests. If approved there, the two will join Indiana as the only substantially industrialized states with such legislation.

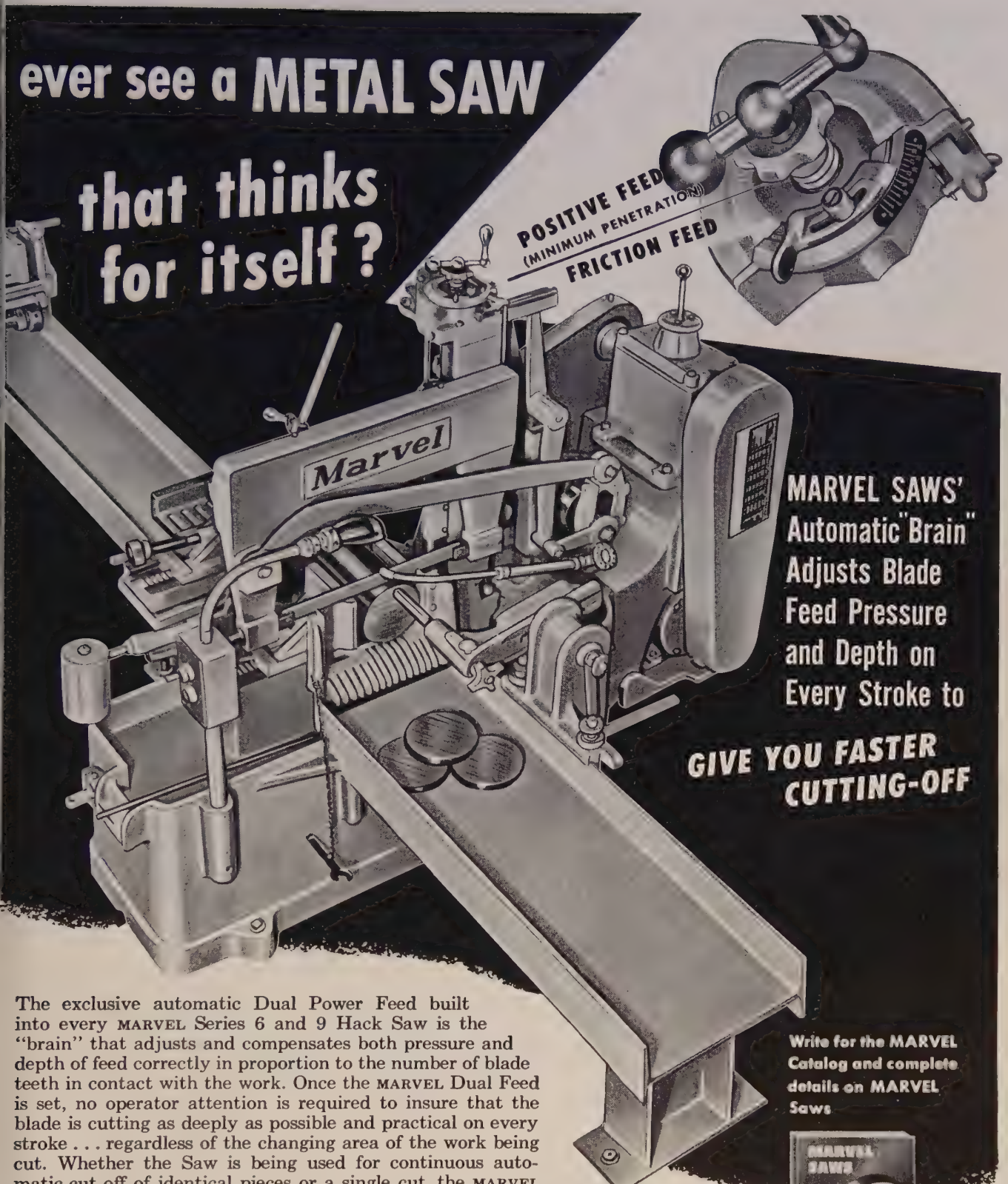
Subsidized Miners

Sen. Gordon Allott (R., Colo.) wants to help Interior Secretary Fred Seaton give our miners a better deal. In addition to the stabilization plan proposed by Interior, the senator wants 70 per cent of the lead and zinc tariff revenues annually set aside for making stabilization payments up to 17 cents a pound for lead and 14.5 cents a pound for zinc. He claims at least $10 million would be available from tariff revenues with this plan—enough to support the first 350 tons of production by each miner. Funds not used to support prices could be devoted to research, loans for maintenance, and new equipment purchases.

Seaton Backs Copper Stockpile

Interior Secretary Seaton backed down from his five-year mineral stabilization program last week to the extent of offering to buy 150,000 tons of domestic copper at prices not exceeding 27.5 cents a pound. Copper was originally included in the program, along with lead, zinc, fluorspar, and tungsten. Sen. James Murray (D., Mont.), chairman of the Interior & Insular Affairs Committee, has joined with six other western senators to urge Mr. Seaton to re-establish the stockpile during the recession.

ever see a METAL SAW that thinks for itself?



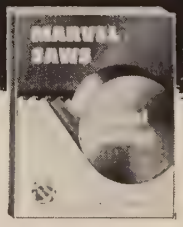
MARVEL SAWS' Automatic "Brain" Adjusts Blade Feed Pressure and Depth on Every Stroke to

GIVE YOU FASTER CUTTING-OFF

The exclusive automatic Dual Power Feed built into every MARVEL Series 6 and 9 Hack Saw is the "brain" that adjusts and compensates both pressure and depth of feed correctly in proportion to the number of blade teeth in contact with the work. Once the MARVEL Dual Feed is set, no operator attention is required to insure that the blade is cutting as deeply as possible and practical on every stroke . . . regardless of the changing area of the work being cut. Whether the Saw is being used for continuous automatic cut-off of identical pieces or a single cut, the MARVEL Dual Feed that practically "thinks for itself" guarantees that the work is cut-off in the fewest possible number of strokes.

Heavy duty MARVEL Series 6 and 9 Hack Saws embody every practical design and operating feature to give you speed, accuracy and operating economy you can find in no other metal cutting saws.

Write for the MARVEL Catalog and complete details on MARVEL Saws



S-1304

ARMSTRONG-BLUM MFG. CO.
5700 BLOOMINGDALE AVE. · CHICAGO 39, ILL.

MARVEL Metal Cutting SAWS
Better Machines-Better Blades

12-ton cast Nickel steel die produced by the Detroit Gray Iron Foundry Company, Detroit, Michigan. Die has sections up to 2 feet thick.

Forms floor pans of "production-line" Fords...

Big runs don't faze deep-hardened cast Nickel steel die

This cast Nickel steel die cold-forms heavy-gauge carbon steel sheets into floor pans for production-line Fords.

This is grueling service: production runs of well over a million pieces . . . severe abrasion . . . terrific impact.

For this reason, Ford uses a deep-hardening nickel alloy steel. Nominal composition is 0.50 per cent Carbon . . . 0.60 - 0.75 per cent Chromium . . . 1.50 - 1.75 per cent Nickel.

Nickel steels are just right for many applications

For parts with massive sections, or variable sections, nickel alloyed steels offer high strength, hardness, toughness and wear resistance. Alloying with Nickel also permits satisfactory heat treatment to develop the full properties of the materials.

A Nickel alloy steel—cast or wrought — may be the answer for your specia service or fabrication need. If you'd like an Inco specialist to work along with you in selecting the right grade just write. Include details.

The INTERNATIONAL NICKEL COMPANY, Inc
67 Wall Street INCO New York 5, N. Y

INCO NICKEL

NICKEL ALLOYS PERFORM BETTER LONGER

Depreciation

Snare in Pricing

We have a friend who is still eating light lunches and otherwise nursing his budget because of an unanticipated bump from the Internal Revenue Service last April. This chap works on a salary and incentive bonus arrangement. Recognizing that the sum withheld by his employer would not cover his income tax obligation, he made a substantial prepayment with the expectation of getting a small refund from Uncle Sam. But he had miscalculated. He still owed Uncle $1140.

We are reminded of his plight while reading the preprints of "Pricing for Profit" on Page 87.

How many managers know how to figure their true costs as they approach their pricing problems?

How many companies realistically figure the cost of plant and equipment consumed? How many make the error of following the government allowance for depreciation of plant and equipment and using those figures in their cost estimates?

As alert managers realize, government allowances for the cost of plant and equipment consumed often are far below the replacement cost. The manager who, for pricing purposes, figures depreciation at the rate allowed by the government for tax purposes may be making the same mistake our friend made in believing that his withholding, plus a reasonable prepayment, would cover his 1957 income tax obligation.

In computing costs for pricing purposes, you may have to sweeten the kitty to cover real depreciation costs. You may have to add to the allowances permitted by government schedules for tax purposes.

Not to recoup the full cost of plant and equipment consumed in establishing your selling prices may mean that you are shipping part of your capital out the back door with every order.

Sure, it's unfair.

Sure, it may mean the buyer has to pay more for your product.

Sure, it may mean you have to keep two sets of books, one to record depreciation allowances dictated by government schedules and one to record the actual cost of plant and equipment consumed.

But that's the way it's going to be until our depreciation laws are brought up to date and until Congress recognizes the fact of inflation in replacement costs.

If we are going to continue as going businesses and avoid becoming statistics in the business failures column, we will have to calculate our true costs, including plant and equipment consumed, in establishing prices.

Walter J. Campbell

EDITOR

FABRICATION WON'T FLAKE TI-CO EITHER

A jai-alai ball travels at speeds over 100 m.p.h.—hits with terrific impact. From a distance of only 60 feet, one of Mexico's leading jai-alai players, Jose Fuerto, slammed the ball into a TI-CO Galvanized Sheet again and again—severely pounding it—but there wasn't a sign of flaking!

In your manufacturing operations, TI-CO can be deep drawn, stamped, bent, crimped, lock-seamed, even spin-drawn, without flaking or peeling. In fact, any product that can be made from cold rolled steel can be made from TI-CO, giving your product dependable protection against corrosion and an eye-appealing finish that can mean stepped-up saleability.

If you are designing or manufacturing a metal product that requires rugged strength plus corrosion resistance, you'll find TI-CO Galvanized Sheets the practical and economical solution. Coils or cut lengths up to 60" widths; gages 8 to 30 inclusive. Consult your local steel distributor or Inland representative. Write today for a free, informative booklet on TI-CO.

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INLAND STEEL COMPANY
30 W. Monroe Street • Chicago 3, Illinois

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Expenditures on New Plants and Equipment

(Millions of Dollars)

	1958*	1957	1956
Manufacturing	12,039	15,959	14,954
Durable goods industry	5,710	8,022	7,623
Primary iron & steel	1,181	1,722	1,268
Primary nonferrous metals	462	814	412
Electrical machinery & equipment	531	599	603
Machinery, except electrical	1,041	1,275	1,078
Motor vehicles & equipment	687	1,058	1,689
Transportation equipment, excluding motor vehicles	401	544	440
Stone, clay & glass products	408	572	686
Other durable goods	999	1,438	1,447
Nondurable goods industries	6,329	7,937	7,331
Mining	936	1,243	1,241
Railroads	735	1,396	1,231
Transportation, other than rail	1,470	1,771	1,712
Public utilities	6,294	6,195	4,895
Communications	↓	3,032	2,684
Commercial & others	9,296	7,366	8,364
Totals	30,770	36,962	35,081

Source: Department of Commerce, Securities & Exchange Commission.
*Estimated.

Capacity To Increase 1.7%

STEEL surveyed 5000 plant managers. Results show metalworking capacity will increase in the second half, but capital investment will be much slower than in 1957

CAPACITY of U. S. metalworking plants will be increased 1.7 per cent in the second half despite the recession, 5000 plant managers told STEEL in a survey. Capacity was hiked 4.5 per cent in the second half last year.

Of those responding to the 1958 survey, 3.1 per cent anticipate building new plants, 4.7 per cent expect to construct additions to facilities, and 13.7 per cent intend to purchase new equipment.

Industry Breakdown — STEEL's survey shows that primary metal industries will boost their capacity 1.5 per cent. Responding makers of fabricated metal products plan a 1.6 per cent buildup in 1958's last half.

Machinery manufacturers (except electrical) will increase capacity 1.7 per cent. Makers of electrical machinery plan the largest boost—2.9 per cent.

Transportation equipment builders expect only a 0.9 per cent gain, while makers of instruments and related products anticipate increasing capacity 2.2 per cent during the remainder of 1958.

Investment Dollars—U. S. businessmen expect to invest $31 billion in new plants and equipment this year (see table), reveals a survey made last month by the Securities & Exchange Commission and the Department of Commerce. That is 4 per cent under the amount reported in a survey three months ago, and 17 per cent below the record $37-billion outlay in 1957.

Capital investment programs have hit an estimated $31.4 billion annual rate in the second quarter, says the government report. Third quarter programs are expected to drop to a $30.3 billion annual rate. In the first three months, capital spending was at an annual rate of $32.4 billion.

Most manufacturing industries expect to spend much less for capital purposes this year than last. Here's a comparison by industry (1958 compared with 1957): Total manufacturing, 25 per cent less; durable-goods industries, 29 per cent less; nondurable-goods industries, 20 per cent less; mining, 25 per cent less; railroads, 47 per cent less; transportation other than rail, 17 per cent less; public utilities, 2 per cent more (the only industry expecting an increase); commercial and other (includes trade, service, finance, and construction), 17 per cent less.

Blast furnaces at Magnitorgorsk

Steelmen Tour Russia

REPRESENTATIVES of the U. S. steel industry have been visiting Russia for the last three weeks.

The first such group to enter the USSR under last January's exchange agreement, the 19 men have viewed iron and steel plants, mines, machinery manufacturing plants, and research organizations.

Headed by Edward L. Ryerson, former chairman, Inland Steel Co., Chicago, the delegation includes experts in steel plant and mining management and two representatives from business magazines.

Included are: John A. Stephens, vice president, U. S. Steel Corp., Pittsburgh (deputy chief of the delegation); James B. Austin, administrative vice president, research and technology, U. S. Steel Corp.; Floyd S. Eckhardt, assistant general manager, Lackawanna plant, Bethlehem Steel Co., Lackawanna, N. Y.; Dr. Michael O. Holowaty, chief research engineer, Research & Development Dept., Indiana Harbor Works, Inland Steel Co., East Chicago, Ind.; Stephen M. Jenks, administrative vice president, central operations, U. S. Steel Corp.; Everett L. Joppa, general manager, Lake Superior Iron Mining Div., Pickands Mather & Co., Duluth; Kenneth C. McCutcheon, consultant, Armco Steel Corp., Ashland, Ky.; Norwood B. Melcher, chief of the pyrometallurgical laboratory, Bureau of Mines, U. S. Department of the Interior, Pittsburgh; Dr. Gunther Mohling, chief metallurgist, research laboratory, Allegheny Ludlum Steel Corp., Brackenridge, Pa.

Also, F. M. Rich, general manager, Indiana Harbor Works, Inland Steel Co.; Earle C. Smith, director of research and chief metallurgist, Republic Steel Corp., Cleveland; Julius H. Strassburger, assistant vice president, engineering, National Steel Corp., Weirton, W. Va.; Irwin H. Such, editor-in-chief, STEEL; George F. Sullivan, editor, *Iron Age*, Philadelphia; Dmitri N. Vedensky, director of research and development, M. A. Hanna Co., Cleveland; Michael F. Yarotsky, division superintendent, steel production, South Works, U. S. Steel Corp.; Prof. M. Gardner Clark, New York State School of Industrial & Labor Relations, Cornell University, Ithaca, N. Y.; Col. Merle R. Thompson, American Iron & Steel Institute.

Itinerary—During the 7000-mile tour, the Americans visited plants, mines, and laboratories no outsiders had previously been allowed to see. They toured the integrated steel plant at Magnitogorsk in the Urals. At Severdlovsk, the delegates saw the plant of Uralmash (builders of heavy steel mill equipment).

The group traveled 1200 miles into Siberia (almost to the outer Mongolian border) to inspect mines and steel mills at Stalinsk. Returning 1400 miles west to the Ukraine, the steelmen saw integrated and alloy steel plants at Krivoy Rog, Dnepropetrovsk. They also viewed the Novo-Pulsky experimental steel plant near Moscow, mines in the Ukraine and the Crimea, and a technical institute at Leningrad.

STEEL's editor-in-chief, Irwin H. Such, will prepare a series of articles on Russian steel and other metalworking progress. As a member of the American steel group which has just visited the USSR, he is in a unique position to appraise fact and fiction about Russia's technology.

Gas Equipment Gains as Appliances Drop

(Factory unit sales)

APPLIANCES	1958*	1957	Gain or Loss
Ranges	1,800,000	1,968,600	−8.6%
Automatic Clothes Dryers	325,000	392,085	−17.1%
EQUIPMENT			
Water Heaters	2,574,000	2,532,000	+1.7%
Direct Heating Units	1,400,000	1,300,000	+7.7%
Central Heating Units	1,000,000	965,600	+3.6%
Wall & Floor Heaters	422,000	411,000	+2.7%
Incinerators	53,000	50,000*	+6.0%

*Estimated by STEEL.
Sources: Gas Appliance Manufacturers Association Inc.; American Home Laundry Manufacturers' Association.

Appliances Grow with Gas

Makers of white goods and heating equipment see potential limited only by number of homes served by gas industry. Second half will see upturn in sales

MANUFACTURERS of gas appliances and equipment, like many other producers of consumer durable goods, are looking to the 1960s for their next big boom in sales. But they aren't discouraged. As the table above shows, they're going to have a pretty decent year in 1958, with a seasonal upturn in the second half.

Producers of gas equipment—heating units, water heaters, and incinerators—constitute one of the busiest segments of metalworking today. The only limit on their market, they feel, is the number of homes served by the gas industry.

Steady Growth—Within the last decade, the number of gas industry customers has increased 55 per cent, compared with an 18 per cent increase in civilian population and a 27 per cent increase in occupied dwelling units, states Clifford V. Coons, president of the Gas Appliance Manufacturers Association.

GAMA officials estimate that 72 per cent of all new homes are served by the gas industry. The percentage is climbing because of the ever widening network of pipelines and the increasing popularity of bottled and tank gas. The Pacific Northwest is especially busy with new construction and modernization because of the opening of the pipeline to that area in late 1956.

Bright Outlook — While water heater sales are dependent to a degree on new sales, the biggest market here is in replacement. The American Gas Association estimates that 21.4 million gas water heaters are in use. Most of them are under 40 gallons in capacity. Replacing those obsolete tanks is the continuing aim of the industry; the campaign will help push sales above the year-ago level.

Incinerators will be another plus in the equipment end of this industry. Held back by building codes, manufacturers think they now have the solution in a smokeless, odorless model. One producer anticipates that the new model will give him a 300 per cent gain in the second half over the first.

Appliances Off—Most producers of gas appliances (mainly ranges and automatic gas dryers) admit that the sales picture this year is cloudy. Even the predictions they made in late 1957 are falling flat. But they prefer to point out that their sales have held up better than those of competitive products. For instance, factory shipments of gas ranges, including built-ins, in the first quarter lagged the corresponding 1957 period by 16 per cent. April shipments closed the gap to 15.5 per cent. Shipments of electric ranges in the first quarter dropped behind the year-ago level by 18.5 per cent.

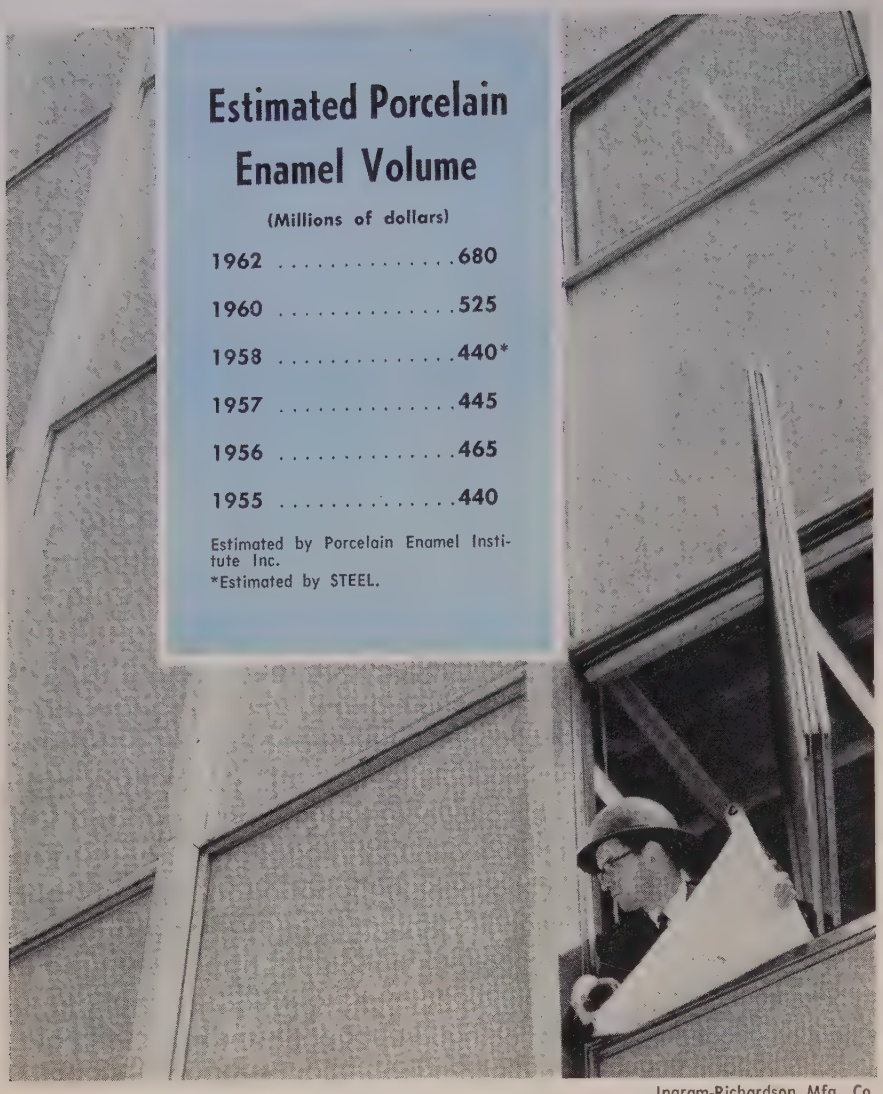
Makers of gas clothes dryers are not that well off. Figures from the American Home Laundry Manufacturers' Association show electric models are off 24 per cent from last year's figures, while gas models are down 30 per cent. But the gas people look to the long term trend which shows that gas dryer sales have grown twice as fast as those of electric dryers since 1948.

Rebirth—New life is being put into the gas refrigerator industry by Whirlpool Corp., which bought the facilities of Servel Inc. in 1957. Whirlpool has introduced its first gas models and is working on a three-year program to improve design, efficiency, and competitive position pricewise. Whirlpool believes it can sell about 275,000 to 300,000 units annually by 1968.

The other part of Servel's business —gas air conditioners—was taken over by the Arkansas-Louisiana Gas Co. It is marketing several home models with the aid of gas utilities.

Better Second Half—Almost without exception, makers of gas appliances and equipment anticipate an upturn in the second half. It will be influenced by seasonal factors and the introduction of new models. Huge inventories will not be a big problem this year.

The upturn will be reflected in the labor force. Of the 20 manufacturers interviewed, not one expects his work force to be lower in the last half of 1958 than it was in the first half. Six expect to increase payrolls significantly. The rest will hold even.



Estimated Porcelain Enamel Volume

(Millions of dollars)

1962	680
1960	525
1958	440*
1957	445
1956	465
1955	440

Estimated by Porcelain Enamel Institute Inc.
*Estimated by STEEL.

Ingram-Richardson Mfg. Co.

Enamelers' Future Is Good

Growth in number of applications for porcelain type makes industry leaders optimistic in spite of recession. Architectural uses are increasing rapidly

THE PORCELAIN ENAMEL industry expects a substantial increase in business in the next five years. This year's slump will not make its leaders retreat one step from that stand.

Sales in 1958—Industry-wide volume will drop about 10 per cent from last year's estimated $445 million (see table), according to most companies queried by STEEL. Volume in 1957 was $20 million under 1956 figures.

The reasons for the decline are the same for both years: Decreased demand in appliances and fewer housing starts, believes Ferro Corp., Cleveland. It looks for a reversal at the recession's end.

Ferro, which has seen its porcelain enamel business grow 20 per cent in the last ten years, expects a 35 per cent increase within five to ten years.

Applications—The Porcelain Enamel Institute, Washington, lists over 200 items being made of coated metal. They range from air conditioners to grave vaults.

A recent PEI survey shows most industry leaders believe use is declining in the manufacture of signs, ranges (free standing as opposed to built-in), incinerators, table tops, and cooking utensils. The reason: Development of other materials to do the job better or cheaper (such as Formica for table tops).

W. J. Kohler, president, Vollrath Co., Sheboygan, Wis., says the market for porcelain enamel in hospital and kitchen utensils (which his firm makes) has been radically declining for ten years. He adds: "The dollar outlook for 1958 in our fields is about one-third under 1957."

On the brighter side, the participating industrialists list increased use in the manufacture of sinks, bathtubs, lavatories, hot water tanks, appliances, lighting fixtures, and industrial products. Hailed with particular enthusiasm are increased architectural applications; PEI expects 65 per cent of the 1961 market for enameled aluminum to be in this category.

James W. Vicary, president of PEI comments: "In 1947, the architectural porcelain enamel industry was doing about $4 million worth of business yearly and this figure represented almost 95 per cent veneer-type construction. Today, total dollar volume of architectural porcelain enamel, including erection and allied materials such as insulation and sealants, is estimated at $56 million." (This is 1957's figure and represents a 12 per cent increase over 1956.)

New Ideas—PEI expects the use of coated aluminum to expand from about 5 million sq ft in 1957 to 23 million sq ft by 1961 (see STEEL, Mar. 3, p. 143). Aluminum Co. of America, Pittsburgh, expects to sell enameled cast aluminum sinks and bathtubs within two years.

Perhaps of even greater interest are recent developments with low temperature processes. Low temperature firing minimizes deformation and warping and makes possible coating of thinner gages of steel. Even toasters can be enameled when steel as light as 24 gage can be used.

Ferro reports development of frits designed to be fired at about 1300° F (conventional porcelain enamel is fired at about 1500° F). Ingersoll

Products Div., Borg-Warner Corp., reports its most promising market in the low temperature field is in architectural panels.

Prices Stay Firm — Despite the present slump in business, prices have remained steady throughout the industry. The last increase was in the spring of 1957.

Fritmakers don't anticipate a need to raise prices in the foreseeable future. The same cannot be said for companies doing the enameling.

Steel is still the most important metal coated. Result: "If steel goes up (as the result of the July 1 wage increase), we're sure as hell going to raise our prices," is the way one Cleveland manufacturer puts it. The price of steel is only one of the enamelers' worries. They also expect their own labor costs to rise. Some manufacturers may be able to absorb higher labor and material costs, but few will be able to withstand a double-barreled attack without passing it on.

Captive Competition — Job shop-captive relations are not as tense as in some other industries. Captives are grouped largely in the appliance field. They and the jobbers avoid stepping on each other's toes.

Job shops in the architectural field are increasing. Some appliance makers are also entering it. Those developments might create areas of tension.

Landis Buys English Firm

Maiden & Co. Ltd., Cheshire, England, a maker of bolt and pipe threading equipment for more than a century, has been purchased by Landis Machine Co., Waynesboro, Pa.

A new company, Landis Machine-Maiden Ltd., has been formed, which will sell throughout the export market, but primarily in England and Continental Europe. Present facilities will be increased by 14,000 sq ft, doubling the present size. The expansion will permit manufacture of Landis chasers and distribution of popular sizes of Landis die heads. Later, Landis threading machines will be made at Cheshire.

J. M. McNeal, export manager of Landis at Waynesboro, has been made chairman of the new company. G. Barry Tinker, Prestvery, England, will be managing director.

Don't Overlook These Costs

- Heat—You can't run a powerplant free.
- Utilities—River water isn't free.
- General facility expenses—Equipment should bear its fair share of overhead.
- Working capital—Du Pont says it equals 100 days of operating costs.
- Carrying charges—Figure a 20 per cent gross return on your investment.

Check Your Cleaning Costs

Du Pont says metal fabricators invest $30 million to $50 million in new equipment each year. Operating costs run nearly $500 million. It holds school for executives

"METALWORKING executives may overlook important parts of the cost picture when trying to decide new equipment problems," thinks D. C. Notman, general manager of Du Pont's Electrochemical Dept.

That's the theme of a campaign launched in Cleveland last week to educate managers, foremen, engineers, and costing men on the fundamentals of metal cleaning costs. A step by step method is used to show how to figure such expenses accurately.

Facts Often Ignored—The most overlooked factor is heat cost, Du Pont engineers stressed. Just because you have a steam plant in operation (even if it's already amortized) it doesn't mean you can get steam from it for nothing.

Utilities run a close second. Sales people are frequently confronted with indifference about the price of gas (20 cents to $1 per million Btu); water (even river or well sources cost 2 to 3 cents per 1000 gallons); and compressed air (3 to 10 cents per 1000 cu ft).

Cite Misunderstanding—Some executives don't allocate a proper share of general facility expenses to a cleaning installation. Experts say, "Allow up to 10 per cent of installed machine investment."

Other factors most often overlooked: Working capital (it's based on 100 days of operating cost); accounts receivable (a degreaser has to carry its share); and investment carrying charges. If you loaned someone $20,000 for example, you'd expect some interest.

Technical Angles—The engineers also point out some technical malpractices which affect costs: You can lose four times too much solvent in mechanical equipment inadequately protected from drafts. Parts hung improperly can carry out a lot of expensive fluid (called drag-out).

The chemical firm hinted it was nearly ready to release a way to phosphatize and paint metal parts in one machine. Dirty parts will emerge clean, painted, and dry.

Manager Knopf (left) and Sales Manager Nelson agree . . .

Sales Start with Education

About one-half the milling machines (and a portion of other machine types) built ten years from now will be numerically controlled. Here's how Bendix is going after the market

POTENTIAL users need to know more about numerical controls. That's the opinion of management at one of the controlmakers, Bendix Aviation Corp. User education is the key to its marketing program.

George Knopf, manager of Bendix's industrial control section, Detroit, adds two other phases to the marketing job: Get acquainted with potential users' jobs and problems; work closely with machine tool builders, selling them first on numerical control, then Bendix.

Education — Understanding (at about the level of the good electrical maintenance man) rather than detailed knowledge is the aim. "The whole concept of numerical control must be better understood—what it will and won't do, and how it can be set up to perform," says Mr. Knopf.

Bendix offers to train personnel (operating, programming, and maintenance) at its users' plants.

Results prove that shop personnel can handle the system. An advanced numerical control course (started this month) will give even more detailed instruction to user personnel.

Job Hunting—The second phase, working with potential users, is already underway. Roy Nelson, sales manager, cites Bendix's close work with a major automobile company that started more than a year ago. "In this kind of work," he explains, "education works both ways."

First, the users' production and engineering men acquire a good speaking acquaintance with numerical controls and give a lot of thought to possible uses, costs, and savings.

Second, Bendix sales engineers get first-hand knowledge of applications that are ripe. For example, Mr. Nelson admits he and his associates figured die sinking in an automotive plant would be a natural. "We learned there is so much cut and try to making body dies, that original die drawings won't do the job." It looks as if numerical control will have to wait until shape and material variables can be incorporated into the drawings, then into the control tapes.

Mr. Nelson says at least one automotive job is ready. With each model change may go as many as 30,000 to 50,000 templates. One auto builder estimates that 4000 to 5000 templates are used in the model and die shops each month. "This template making is a natural for us," says Mr. Nelson. His guess: Numerical control will get these jobs soon.

Through Channels—Most sales of numerical control systems will be made to machine tool builders. "The user is not buying a machine and a control; he's getting a numerically controlled machine tool. There's an important difference." That's how Mr. Nelson explains the importance of integrating design of the machine and control.

Of the 26 tape control systems Bendix has shipped, 25 have gone to machine tool builders to be added to new machines. "That's the way it will continue," says Mr. Knopf. A scattering of controls may be sold to users for adapting to existing equipment, particularly on machines now working on tracer applications. But such a job will not be a major part of the market.

The Beginning — Bendix's first shot at the control business was as a problem solver. Someone from the company's aircraft product section

was dissatisfied with the long lead-time needed to make jet engine control cams. The problem was referred to the Research Laboratories Division. The answer: A tape controlled milling machine, delivered in October, 1954. It has been running on two shifts ever since, cutting leadtime from ten weeks to one week.

Next came a contract from Martin Co. for a complete system. Bendix engineers worked out the machine details with Kearney & Trecker Corp., Milwaukee, and the complete package was delivered about a year ago (STEEL, May 6, 1957, p. 101). After that came 22 control systems for K&T machines delivered as part of a large Air Materiel Command program. Since those, two others have been shipped—one to Pratt & Whitney (see photo) and the other to Ex-Cell-O Corp., Detroit, for use on a turbine blade milling machine.

Tape Preparation — The control package (it costs the user roughly $70,000 to $75,000 for a three-dimensional system—about 10 per cent less for two dimensions) includes all the servodrive motors that go with the machine. Bendix tape preparation equipment (including the typewriter, computer, storage unit, and tape punch), costs about $65,000. Six of them are in use. Mr. Nelson explains: "Most buyers of tape control have been large companies, and many already have electronic digital computing equipment that can prepare tapes."

Five of the six who are using Bendix's tape preparation package lease them for $2000 a month. For those just getting started, Bendix (and some Bendix users) will make tapes from process sheets prepared by the user.

The triple-choice (buy, lease, or farm it out) scheme for helping the buyer get control tapes illustrates management's approach to marketing a product in a new, spectacular, sometimes awe-inspiring industry. Make it easy to understand, simple to use, and as economical as possible. Then help the customer put it to work.

Handling Updated

Visitors at material handling show in Cleveland see new and versatile equipment

MANAGERS looking for better or faster ways to move material picked up some new ideas while touring Cleveland's Public Auditorium last week. It was the scene of a national material handling exposition—175 companies showed wares ranging from railroad car dividers to automatic conveyor lubricators.

Among items attracting top attention was a truck for level loading or unloading at any height from curb side up to 52 in. The bed is hydraulically raised or lowered by moving four control valves in the right rear corner of the trailer. The bed can also be adjusted horizontally to conform to uneven docks. It's available is sizes from 1½ to 10 tons and in several body styles.

Operating Exhibits Plentiful — Visitors were attracted by numerous operating exhibits of conveyors (belt, roller, wheel, pneumatic, gravity flow, vibrating, overhead, electronically controlled), strapping machines (automatic and manual), hoists, mobile access lifts (telescopic and scissors link), lift trucks, tractor shovels, mobile cranes, floor sweeping machines, and other devices.

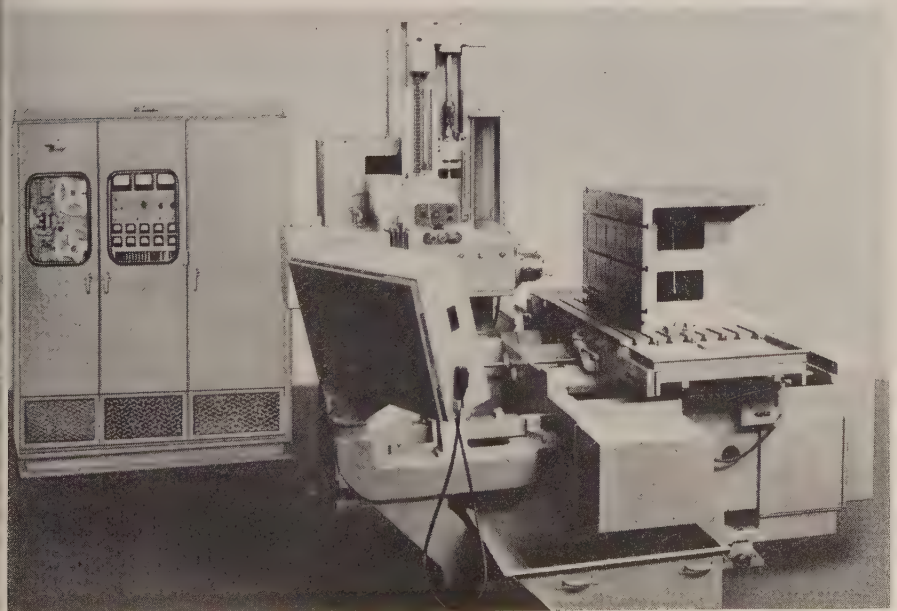
ASME Holds Conference—Along with the show, the American Society of Mechanical Engineers held a four-morning conference on new approaches to engineering problems of material handling equipment.

Featured speakers included:

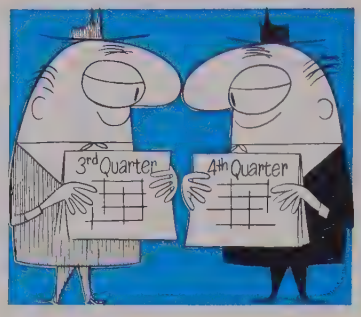
Dr. David B. Hertz, manager, Operations Research Dept., Arthur Anderson & Co., New York. He encouraged the use of operations research in material handling problems. He defined OR as "an attempt to understand, in a practical way, complex problems in which there are many variables, complicated relationships, uncertainties, and possibly, conflicting objectives." He said such problems are difficult to solve through judgment or intuition but require a scientific approach.

Arthur M. Perrin, president, National Conveyors Co. Inc., Fairview, N. J. He urged delegates to write to their congressmen and ask that depreciation policies be revised. He said: For 12 years after World War II, the U. S. economy thrived on demand for products that had been in short supply. Now supply exceeds demand, and we have to improve our efficiency. He listed four ways to help a company's competitive position: 1. Improve the efficiency of the engineering department. 2. Price products competitively but realistically. 3. Increase the payoff from specially designed products by incorporating the new designs into the line as standard items whenever feasible.

Allan Harvey, Dasol Corp., New York. He asserted: "Every manager should take a good look at what systems engineering can do in material handling."



Pratt & Whitney Co. Inc., West Hartford, Conn., is marketing its Model C Keller profiling machine with Bendix tape control. This is the kind of builder-control-maker project Bendix feels is a must



Joint Committee Checks Recovery Chance

"THERE ARE few signs of an early upturn" in the economy, reports the Joint Economic Committee, chairmanned by Rep. Wright Patman (D., Tex.). "A significant rise" in the gross national product is not expected by the committee until the fourth quarter "at the earliest." The group doesn't believe that encouraging signs cited by STEEL (Page 65) are yet conclusive.

Complete recovery may be delayed until "late in 1960," although it could come midway in 1959. Unemployment is expected to average about 5 million this year (7 per cent of the civilian labor force) and into the first quarter of next year.

Sums up the committee: This recession is already as bad or worse than those of 1949 and 1954. We have lost $18 billion in GNP in the first six months. Loss in business investment (inventories and new plant and equipment spending) accounts for most of it.

Construction Paces Comeback

Associated General Contractors, Washington, says the construction industry is "leading the way out of the recession." The AGC's 125 chapters report: Building—about normal. Highway—above normal. Heavy construction—normal. Prospects for the rest of 1958: Building—normal or better. Highway—well above normal. Heavy—about normal. Most AGC members conclude that the Federal Aid Highway Program is on schedule or behind. Only 20 per cent think it is ahead of schedule.

In some areas (40 per cent of the nation), the recession has had little or no effect on construction business, although more than 70 per cent of the contractors note brisk competition for jobs.

AGC concludes that new construction contracts have an immediate effect on the industry because the pipeline of materials is generally full.

Corporate Taxes Extended

The House vote to extend corporate taxes (at their present 52 per cent rate) and excise taxes was done under a "no amendment" rule (the usual case with House tax bills). The situation will be different in the Senate this week and next. Amendments are bound to come from all directions. The outlook for a cut in auto taxes remains good, most observers agree.

The test will be in the return of such a reduction to the House: Ways & Means Committee Chief Wilbur Mills (D., Ark.) is still tough in his position against cuts. Uncle Sam cannot afford a wholesale reduction of excises (it could cost $2 billion in fiscal 1959), and Mr. Mills believes trimming of some excises is discriminatory.

The best bet for tax relief continues to be help to small businesses—allowing them to deduct investments for new equipment (a percentage of the annual total or a flat figure) from taxable income.

Tools Get Uncle Sam's Attention

The President has submitted a request to Congress for $3.5 million "to finance the cost of maintaining an unanticipated increase" in the machine tool and industrial equipment reserve held by General Services Administration for emergency use. At the same time, a Business & Defense Services Administration spokesman reports that schools in 20 states have requested about 20,000 tools from Uncle Sam, under the new policy of donating surplus tools. Based on the 20-state sample, BDSA guesses between 50,000 and 100,000 tools could be disposed of. The Health, Education & Welfare Department, which controls the school program, is encouraging the Pentagon to let the tools become surplus faster than originally planned.

The Industrial Reserve and School programs work together to protect the tool market. Some 5000 tools will go into the National Industrial Equipment Reserve next year (only 500 went in last year).

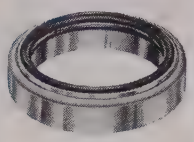
Pentagon Puzzle

After the first sputnik, the Defense Department denied the existence of any spending ceiling. (During most of last year, Defense held back new orders to avoid spending over $38 billion in fiscal 1957.) Now, there is new evidence of a lid on spending: The Navy will cancel plans to build nine ships, including two destroyer escorts, a helicopter assault ship, four guided missile frigates, and two guided missile cruisers. Savings will amount to about $500 million. Shipyards affected are in Philadelphia, San Francisco, Seattle, and Avondale, La.

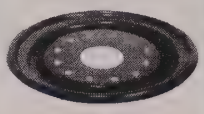
Plans call for about $40.5 billion to be spent in fiscal 1958. Unofficially, the Pentagon would probably like to hold spending next fiscal year (beginning July 1) to less than $42 billion. With the extra funds voted by Congress for Polaris firing submarines (about $650 million), the Navy appears to be cutting other building programs to hold spending down. Aircraft manufacturers report off the record that they are receiving requests from Air Force officials to hold up delivery on finished aircraft until next fiscal year. Consensus: The ceiling was never dropped. It was just lifted a little.

VALUE ANALYSIS where it really counts ...during design!

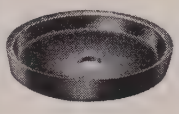
C/R Shaft Type Oil Seal



C/R Standard End Face Seal



C/R Sirvene Diaphragm



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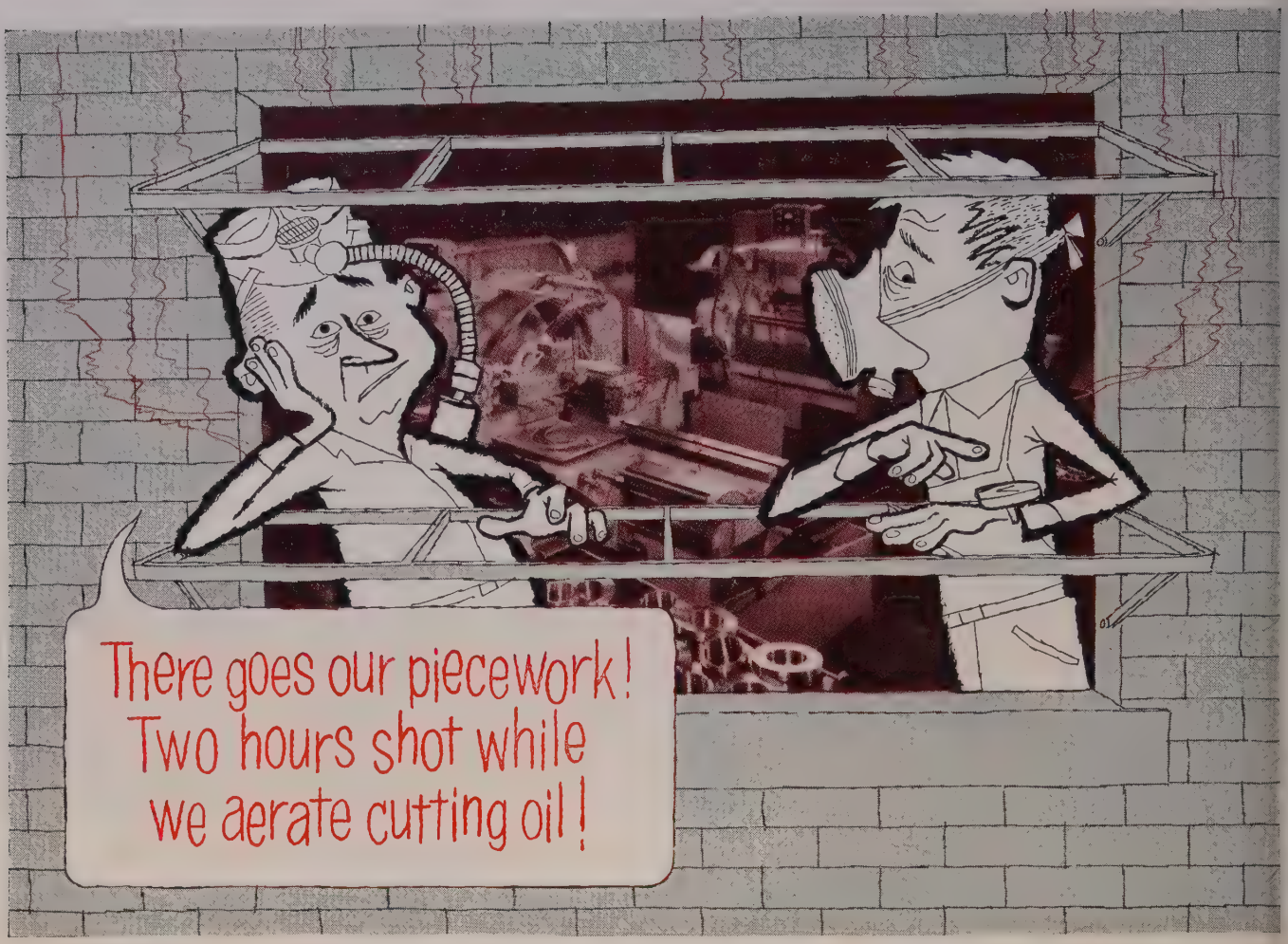

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METALWORKING LUBRICANTS

Industry reacts, wants . . .

Bold Action on Depreciation

STEEL's mail continues to be unusually heavy because of its pleas for depreciation reform as a way to fight the recession (see Apr. 28 issue). STEEL's recommendations: Return to five-year amortization until June 30, 1959, while an industry-government commission has time to prepare for Congress' consideration a permanent, liberal depreciation system. Here's a sample of what some industrialists think of the proposal (for other comments, see May 19 issue, p. 95 and June 2 issue, p. 45).

W. E. Rutz, executive vice president, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.—"The productive facilities of industry are wasting assets because of wear and obsolescence. If any depreciation policy makes no allowance for inflation, industries employing large amounts of appreciable assets are subject to a tax discrimination that is bad for them, as well as for our nation.

"To make progress, this country requires and deserves liberalization of our tax depreciation policy. It will be a tremendous aid."

Ralph E. Cross, executive vice president, Cross Co., Detroit—"I have followed your program with a great deal of interest and hope you will continue it until proper reforms are made. I had hoped Congress would be more receptive to a change in the law at this session.

"I would like to see an intensive drive for complete reform, as opposed to partial reform now with the balance to come later. If possible, I would like to see the elimination of Bulletin F and the adoption of the bracket approach."

J. O. Ellison, president, Harron Rickard & McCone Co. of Northern California—"I was pleased to receive a copy of your excellent article on depreciation. The program which you set forth would certainly provide a much needed stimulant not only to this industry but also to the industrial economy of our nation.

"The one comment I would like to make on your approach concerns capital gains privileges on machines if they are sold at greater than book value. In my opinion, we will never be successful in obtaining accelerated depreciation privileges if we do not simultaneously relinquish the capital gains privileges as they exist. The reason being that you would create the conditions for an unintended tax benefit.

"I am certain you can appreciate how easy it would be for certain companies to purchase general purpose machine tools which they did not require in their business and depreciate them at an accelerated rate without using them, and in a matter of two or three years sell them with an excellent capital gain."

E. E. Hartford, manager, Hartford Sales & Engineering Co., Lisbon, Ohio—"Is is not logical to believe that keeping our machinery producing plants thoroughly modern at all times is good preparedness (for war)? By the same token, is it not good preparedness to keep our metal producing mills thoroughly modern at all times? If those points are valid, what better way can these manufacturers accomplish their objectives than by having access to a modern depreciation law?

"Please witness: We have had a war on an average of each 26 years since 1775. Thirteen years have passed since the close of World War II in Europe.

"Admitting my ignorance of international relationships, I feel our adversaries would think twice if they knew that we were better equipped than they to produce munitions. Adequate tax writeoffs could make more shops and mills better equipped.

"I could not resist the temptation to write you as above, hoping that it will afford another approach to this important issue."

1958 Census of Manufactures Program

Annual survey sample (50,000 establishments) of products, materials, and miscellaneous data.

The 1958 census of over 100,000 establishments (similar to the 1954 census).

Annual commodity studies.

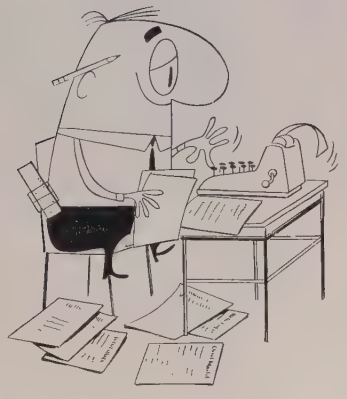
Supplemental survey of nonpayroll costs (50,000 establishments).

Survey of research and development spending (6000 establishments).

Census of manufacturers' sales by distribution channels (50,000 establishments).

Typical Uses of Census Data

1. Comparing activities and characteristics of one company to another's to measure a firm's long range position and the effect of current trends.
2. As background for making activity, profit, and employment decisions depending on locality.
3. Directing advertising to the best media.
4. Locating sources of materials and supplies.
5. Determining new plant locations, branch warehouses, and sales offices.
6. Establishing sales territories, manpower requirements, quotas, and compensation plans.



New Census Data Coming

Check this roundup of the '58 program: New information may make your marketing job easier in the '60s. Don't overlook the possible benefits of special tabulations

INDUSTRIAL MARKETERS can look for new help from Uncle Sam this year and next. The Bureau of the Census is making its annual collection of data on manufactures, plus some important supplementary samplings and the first complete "census of manufactures" since 1954.

Nonpayroll Costs—An example of the new efforts is a survey of 50,000 plants (the same establishments that are in the annual census of manufactures) on nonpayroll costs, including: Maintenance and repair, supplemental costs like pensions and health benefits, insurance, rental payments, taxes, fixed assets, and depreciation charges. Maxwell Conklin, industry division chief of the Census Bureau, notes that those costs are becoming more significant as fringe benefits mount and equipment becomes a bigger part of the cost of doing business. The sampling will also give the book value of plants and equipment for the first time since 1919. The material, which covers costs for each industry by state in 1957, will be available this year.

R&D Costs—In co-operation with the National Science Foundation, Census will survey research and development spending for 1957 and 1958.

Distribution of Sales — For the first time since 1939, says Mr. Conklin, marketers will get new information on product sales by distribution channels such as government, export, industrial, wholesale, retail, and household. Still in the planning stage, this survey can be better than the 1939 study, Mr. Conklin believes. It may be done on a corporate basis by product line to adapt the census to a firm's method of keeping records.

The Big Job—Besides the annual census of manufactures and the commodity annuals, Census Bureau is again doing the big job of surveying more than 100,000 plants. It will "follow the pattern of the 1954 census pretty closely," says Mr. Conklin, "but new products will be included and new data on consumption will be available." With electronic equipment now in use at Census, it will be possible to show more interrelationships among

7. Estimating sales potentials and sighting industries which should receive special marketing effort.

Special Work Done at Cost for Industry By Census Bureau

1. Amount of blast furnace gas produced per ton of coke consumed.
2. Number of plants (by states) shipping structural steel valued at $50,000 or more.
3. Consumption of copper and copper base alloys in mill shapes and forms.
4. Shipments of auto storage batteries by types of customers and by geographic location of producing establishment.
5. Regional and state consumption rates of electricity, fuels, water, and horsepower.
6. Shipments (quantity and value) of aluminum sand castings, aluminum permanent mold castings, and aluminum diecastings.
7. Quantity and value of steel consumed by four-digit industries within a state.
8. Use of ceramic materials and other mineral products by size groups and counties.

blocks of data, he says, and adds, "more promptly."

Behind It All: SIC—No census would be valuable without a system for classifying the mountains of information collected. Here's where the Standard Industrial Classification (SIC) comes in. It categorizes all industries by the products they turn out. So Group 33 is primary metals and is distinguished from Group 34, fabricated metal products. A third digit is added to the code, depending on materials (ferrous, vs. nonferrous, for example) and processes (primary processing, secondary smelting and refining, rolling, drawing, or alloying). A fourth digit depends on the metal going into the product (copper, vs. lead, for example), or the process employed, or type of product (welded, vs. heavy riveted pipe, for example).

Robert Burgess, director of the Bureau of Census, says SIC isn't logical. It is a system which "follows what manufacturers choose to do." Various industry groups urge modifications of the SIC at times. Last year's changes (STEEL, Aug. 5, 1957, p. 65) are an example: Changing defense policies brought guided missiles, formerly under aircraft (SIC 3721), to the ordnance group (SIC 1929). Machine tools were redefined and other changes made. The Census Bureau's job this year is complicated by the necessity of tabulating its new census in terms of both the old and new SIC.

How To Get More Help—The SIC and the censuses based on it give plenty of help to marketers (STEEL's book, *Metalworking Markets in the U.S.A.*, for example), but Census is also prepared to lend a hand on company problems.

Clarence Olsen, metal and metal product chief of the industry division, points out that Census is not in competition with private research firms, but it does offer two kinds of informal help and one formal aid. If you request certain data from Census which are in published form, a clerical assistant mails it to you promptly. If your request cannot be answered simply, a professional in the division can advise what data can be made available. Mr. Olsen says he prefers "to sit down and talk about" a marketer's more difficult problems, rather than try to help him through correspondence only. When the division is not able to answer requests, it sends everything published in the area of interest and recommends other sources of data (like other government agencies or trade groups).

Special Projects—The biggest help can come from special compilations of data in the census. "Consumption of Steel Mill Shapes and Forms," done at the request of the American Iron & Steel Institute, is "a good example of what can be compiled," points out Mr. Olsen. Parts of the survey represent material printed in regular 1954 census data, but three parts were paid for by AISI (consumption by industries within states, by states, and economic areas).

Mr. Olsen believes the surveys are done at "minimum cost" for the time involved and the amount of data made available. Some projects are completed in as little as two months; others take much longer, depending upon the workload of Census personnel.

Cost may be in the hundreds or thousands of dollars. Average cost may be under $1000, says one observer.

A census program "can go only so far in exhausting information because we try to publish data of the widest possible use," says Mr. Olsen. Much data can be retabulated into many forms for the marketer. Census reserves the right to publish any special surveys itself, after such work is done, if it deems the new compilation of "public interest."

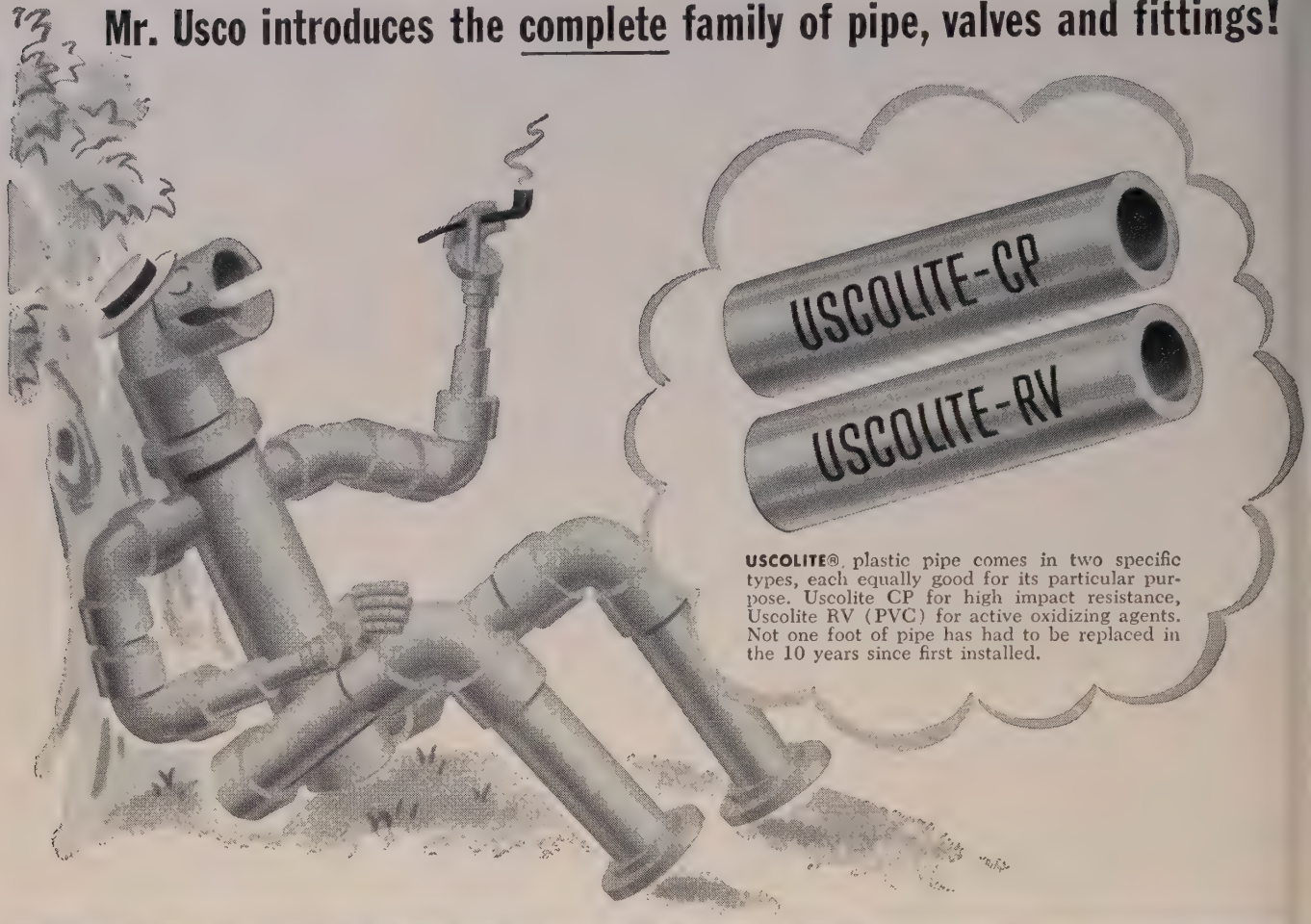
Crux—A final word: If the marketer hopes to get accurate and thorough information from the Census Bureau, his firm must, in turn, be willing to provide information about itself when the Census man calls.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

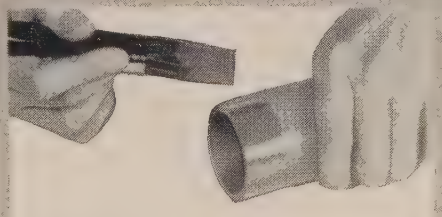
USCOLITE PLASTIC PIPE

PIPE DREAMS come true!

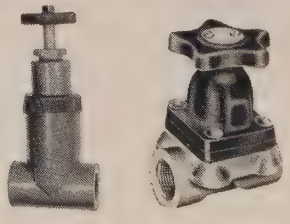
Mr. Usco introduces the complete family of pipe, valves and fittings!



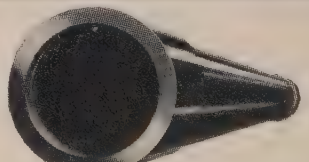
USCOLITE® plastic pipe comes in two specific types, each equally good for its particular purpose. Uscolite CP for high impact resistance, Uscolite RV (PVC) for active oxidizing agents. Not one foot of pipe has had to be replaced in the 10 years since first installed.



USCOWELD* Fittings are the only solvent-weld fittings with an interference fit. Greater joint strength, faster insertion. Non-porous, leak-proof. Made of either Uscolite CP or RV materials.



USCO® VALVES offer a choice of either Hills-McCanna diaphragm valve or Vanton "Flex-Plug" gate valve.



USCOFLOW is a new, black utility pipe, especially suited where low first costs are a factor. It is a blend of styrene-base resin and synthetic rubber for good impact resistance and high tensile strength.

The "Usco" Plastic Pipe Line of precision-molded pipe and fittings for every corrosion and flow problem includes elbows, tees, couplings, flanges, reducing bushings, plugs, caps, nipples, bends.

When you think of plastic, think of your "U.S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality plastic pipe and fittings.

*Patent applied for

Mechanical Goods Division

United States Rubber

Rockefeller Center, New York 20, N.Y.

In Canada: Dominion Rubber Company, Ltd.

Earl says Americans want big cars

Designers Sundberg and Ferar say: Design them so people can tell them apart

Stylists Can Save Big Cars

Designers can cure the look-alikeness of U. S. autos, but some say they need freedom from executive orders. Price class distinction is also desirable, they add

IF CAR DESIGNERS could stop executives from making styling changes, they would be able to avoid similarity of appearance, and the automobile would again become a major prestige symbol, contend Carl Sundberg and Montgomery Ferar, owners of Sundberg-Ferar Inc., Detroit, one of the country's five largest industrial design firms.

Their previous experience with autos makes their comments worth heeding. Being outsiders with no ax to grind ("we wouldn't return to auto designing," says Mr. Ferar) makes them more objective toward styling problems.

An accusation aimed at the industry is voiced by Dr. Lawrence Hafstead, research vice president for General Motors Corp. He suggests that car companies are so entranced by their own business that they seldom look elsewhere for new ideas and techniques.

Prestige Lost — The idea that Americans no longer feel proud to own big cars cropped up last year. George Romney, American Motors Corp.'s president, says it explains the success of imported cars and his Rambler.

Other car builders have picked up the idea to partially excuse their showings against economy cars. Stylists have some ideas of their own.

Don't Know Why—Says Harley J. Earl, GM's styling vice president: "I'm sure that today's automobile is not exactly what people both here and abroad want." Mr. Earl feels buyers want luxury cars, but they don't want to pay so much for them. The problem is one the auto industry can't lick alone.

Another problem: Detroit can't make cars as mechanically perfect as buyers think they should be. As autos became less of a luxury, owners began taking them for granted and, like any necessity, expected them to work.

But Messrs. Sundberg and Ferar think the industry can do something about the "sameness" in looks which is plaguing Detroit stylists.

Why It Happened—In the early 1920s, a car was still basically a novelty and seldom practical. Owners were proud they could afford one and even prouder if they could keep it running.

By the mid-1930s, car ownership and the make you drove fixed your station in life. Plymouth buyers were looking forward to owning a Dodge, and Dodge owners were saving for Chryslers. A Packard was the ultimate for many.

Upgrading Began — About this time, some smart cookie realized that everyone couldn't afford Cadillacs. Adding some chrome to a Chevrolet would make it look more expensive.

So the great race was on. More

and more accessories were added; more parts were made interchangeable; and smaller cars were made longer. This year, a Plymouth is only 16 in. shorter than a Chrysler and both offer much the same accessories and styling.

Now What?—What can designers do to put prestige into cars? Mr. Ferar believes most people instinctively recognize good and bad design, and he's convinced auto industry stylists know how to give them the good.

But Detroit's full of stories about the top company executive who says at final styling previews: "I think we should add more chrome to the side. My wife thinks it looks bare." No esthetic logic by stylists can sway him.

Mr. Sundberg adds: "Today's automobile design is poor—no question about that, but this will change when designers are left alone. Design by executive order must stop."

Avoid Sameness—Messrs. Sundberg and Ferar also think greater distinctions should be made between models so buyers will have more desire to upgrade.

Less expensive cars should be smaller and without so many accessories. Less expensive designs should be simple—not severe, and chrome should be applied to all cars to accentuate design—not obliterate it.

By appealing to the public's inherent good taste ("Let's leave off the gargoyles, jigsawwork, and excessive ornamentation," says Mr. Sundberg) buyers will again be proud of their cars.

Late Production Figures

Ford Motor Co. says it built 111,358 passenger cars and trucks during May for a year-to-date total of 607,272. At the same time, it reports Edsel sales in May increased 12.9 per cent over April's, and Lincoln's Continental Mark III sales are approaching the combined total of all previous Continental series.

Included in May production figures were 5461 Thunderbirds, raising this model's five-month production total to 17,721 units, vs. 8409 in the same time last year.

At the end of May, the company had produced 433,932 Fords, vs. 692,344 in last year's first five months; 55,111 Mercurys, compared with 153,686 last year.

Lincoln production stands at 13,424, against 21,422 in 1957, and Edsel has built 6447 cars since the year began—1171 of them in May.

Chrysler Corp. — Its five-month totals show that Plymouth built 166,903 units this year, compared with 316,857 last year. Dodge made 44,679, against 143,249; and De Soto turned out 15,868 cars by the end of May, vs. 65,735 last year.

Chrysler totals are 25,615, against 1957's output of 61,201, and Imperial totals 6902, compared with 20,351 last year.

GM Strong — Here's the five-month production rundown for General Motors Corp.:

	U. S. Cars Only	
	1958	1957
Chevrolet ..	601,127	665,562
Pontiac	106,188	172,405
Oldsmobile .	155,557	198,139
Buick	116,928	211,657
Cadillac ...	65,445	71,642
Totals	1,045,245	1,319,405

Big Bet in Auto Labor

General Motors Corp. is as determined as the United Auto Workers to wait it out all summer if necessary. Ford may not be able to hold out, and Chrysler probably would like to settle soon if it can negotiate a workable contract.

Although Chrysler's disciplining of union stewards put the spotlight on that corporation last week, GM is still the force to be watched. GM's thinking: After a summer of heavy unemployment, workers won't have much stomach for a strike if the companies make a reasonable offer about the time new model production is slated to start.

First Blush—Workers have enthusiastic loyalty to the union's cause right now, particularly since most of them are veterans of early UAW campaigns. But after a long summer without work (at least two GM divisions are scheduled to shut down at the end of this month), even those diehards may prefer the prospect of full workweeks with a slightly sweetened contract.

Ford in Bind—Ford may hope to use the same tactics. But its situation is complicated by the fact that union leaders may have more difficulty in keeping the members under control.

Nor is Ford in as good a position as GM to weather a long model changeover or shutdown. The Ford Div. needs all the production it can get to stay anywhere near Chevrolet in sales.

Chrysler Tough — The lack of union discipline at Chrysler already has become evident. Mr. Reuther is having trouble keeping the militant locals from widespread walkouts. While each of the Big Three has tightened up on rules governing the time stewards and committeemen must spend on the job, Chrysler has been the toughest by far.

The thinking around Detroit is that if Chrysler can come to any terms with the UAW it will settle early, regardless of what Ford and GM do. It needs better work standards and reportedly is willing to grant concessions to get them. Because Chrysler is so far behind Ford and GM in that area, any action it takes probably wouldn't be detrimental to the Big Two's chances of holding firm.

The Gamble—GM is making one of the most dramatic bets in labor history. Ford is along, too, although reluctantly. Chrysler's actions won't seriously affect the gamble. GM believes a long layoff will cause the workers to lose faith in Mr. Reuther and open the way for a moderate settlement.

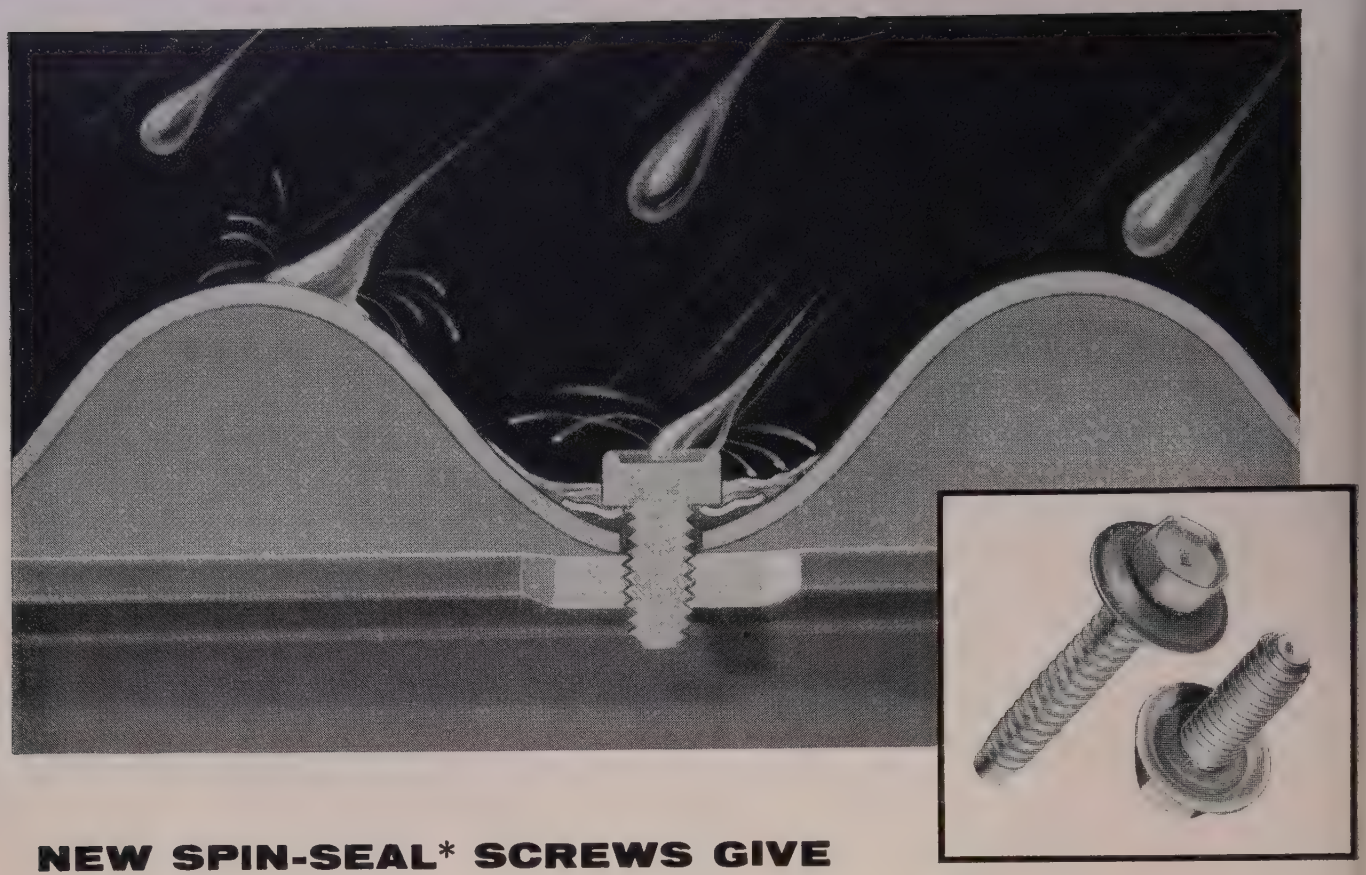
U. S. Auto Output

Passenger Only

	1958	1957
January	489,357	642,090
February	392,112	571,098
March	357,049	578,826
April	316,503	549,239
May	349,474	531,365
5 Mo. Total	1,904,495	2,872,618
June	.....	500,271
July	.....	495,629
August	.....	524,354
September	.....	284,265
October	.....	327,362
November	.....	578,601
December	.....	534,714
Total	.....	6,117,814

Week Ended	1958	1957
May 10	78,506	125,924
May 17	87,407	172,390
May 24	86,589	127,428
May 31	66,574	82,431
June 7	74,022†	129,517
June 14	80,000*	125,372

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.



NEW SPIN-SEAL* SCREWS GIVE

leakproof fastening

in products . . . in construction

THESE NEW, leakproof fasteners combine a special washer† and built-in sealant with standard machine, cap, or tapping screws.

Three-way seal — Tightening the RB&W "SPIN-SEAL" screw forces the flow-in sealant into spaces around the (1) head, (2) threads and (3) clearance hole, hermetically sealing the opening. The concave, springy washer confines and controls the flow of the sealant and provides an *additional* spring tension seal. Even on corrugated surfaces, the washer conforms to the curve of either crown or valley.

Permanent gasket — Compound is plastic, rather than elastic. Stable and non-aging, it won't split or ozone-check under pressure, is unaffected by industrial atmospheres, resists water, acids, also oil.

Won't gouge finish — Since the washer does not turn with the screw, finished surfaces are not damaged during installation. Nor is there any twisting or damage to sealant.

Standard styles — "SPIN-SEAL" fasteners are available in all standard screw styles except flat head.

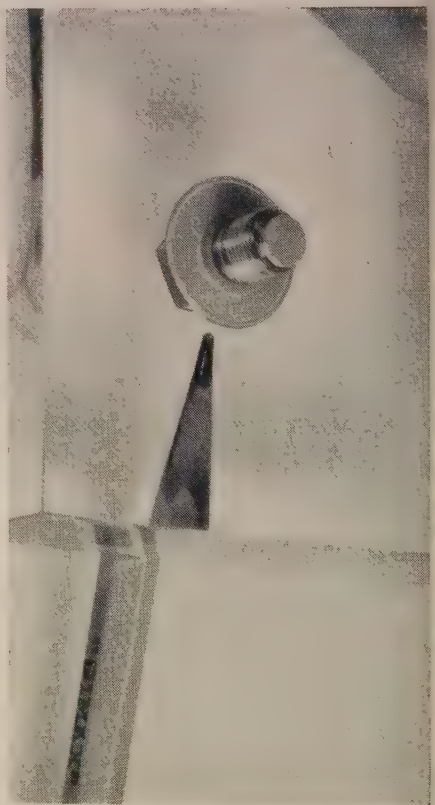
Send for new bulletin SS-1A. It gives full information on "SPIN-SEAL" fasteners. Russell, Burdsall & Ward Bolt and Nut Co., Port Chester, New York.

*Trade Mark

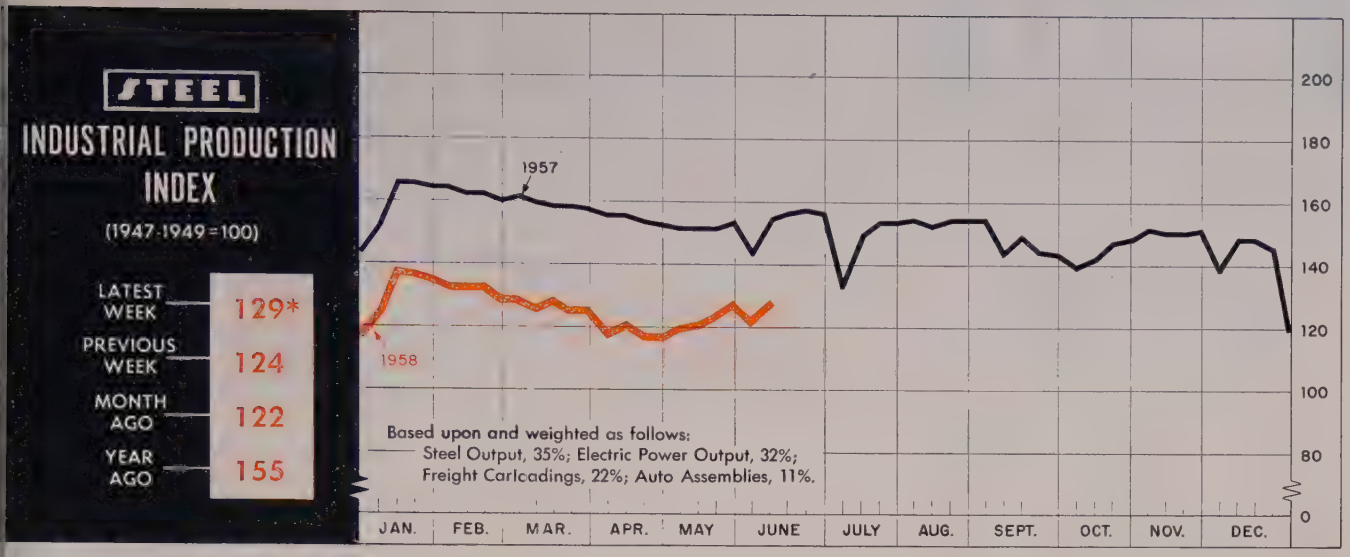
†U. S. & Can. Pats. Pend.

R B&W
113th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Fargo. **Distributors from coast to coast.**



Note how sealant fills space under washer and flows into clearance hole and around threads of RB&W "SPIN-SEAL" Screw.



*Week ended June 7.

Production Snaps Back from Holiday Loss

THE SPRING UPTURN is no longer a matter of conjecture—it's a fact. And it hasn't yet run its course. The genuineness of the pickup was established when STEEL's industrial production index bounced all the way back from the Memorial Day week to a preliminary 129 for the week ended June 7 (1947-49=100).

This is the first substantial seasonal expansion of the index since the fall of 1956. It is improbable that it could have happened if the forces of recession were still in full play. During 1956, when the economy was coming off the boom peaks, depressant factors prevented an upturn in the second quarter and all but wiped out the rise in the fourth quarter. (See chart above.)

Proper Relationship—Many businessmen may fail to recognize the uptrend for two reasons: 1. Even the expansion of 9.3 per cent in the index during the last six weeks leaves the economy well below the level of a year ago. 2. Not all segments of the economy are sharing alike in the improvement. Many metalworking industries—especially capital goods—may be on the sidelines watching the activity for several months. But compared with the general direction in which economic activity was headed for over a year, the present situation must be regarded as a turning point.

More Coming — Final figures showed that the index dipped only 5 points during the Memorial Day week (the smallest percentage decline for that period since the 1947-49 base period was adopted in 1953). Steel operations, freight carloadings, and electric output accounted for a full recovery the following week. Only auto production failed to maintain the preholiday pace. This pattern will prevail through June.

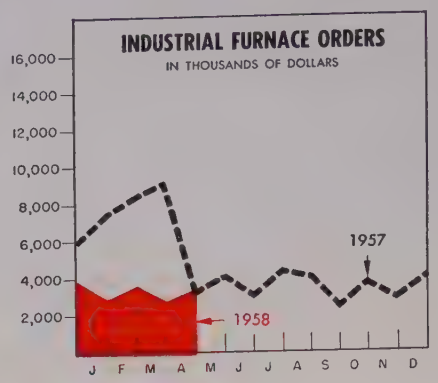
Steelmakers continue to shove up operations in response to a rising trend in demand. During the week ended May 15, the nation's steel mills were scheduled at 64 per cent

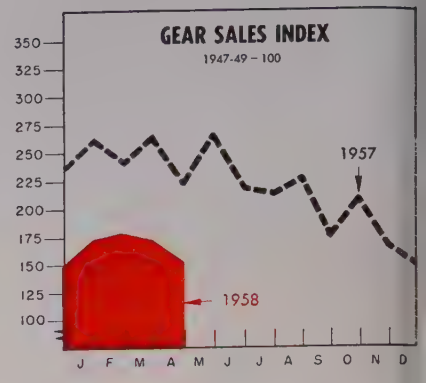
BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,723[1]	1,685	2,214
Electric Power Distributed (million kw-hr)	11,300[1]	11,000	11,550
Bituminous Coal Output (1000 tons)	7,145[1]	7,570	8,831
Crude Oil Production (daily avg—1000 bbl)	6,250[1]	6,242	7,338
Construction Volume (*ENR*—millions)	$481.4	$424.0	$442.7
Auto, Truck Output, U. S., Canada (*Ward's*)	98,579[1]	91,979	163,437
TRADE			
Freight Carloadings (1000 cars)	565[1]	530	733
Business Failures (Dun & Bradstreet)	278	337	225
Currency in Circulation (millions)[3]	$30,987	$30,813	$30,836
Dept. Store Sales (changes from year ago)[3]	−1%	+3%	+1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,547	$21,129	$18,812
Federal Gross Debt (billions)	$275.7	$275.4	$275.2
Bond Volume, NYSE (millions)	$29.7	$20.8	$20.4
Stocks Sales, NYSE (thousands of shares)	13,530	9,298	10,861
Loans and Investments (billions)[4]	$92.1	$91.8	$86.2
U. S. Govt. Obligations Held (billions)[4]	$31.1	$30.9	$25.9
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	228.59
STEEL's Nonferrous Metal Price Index[6]	194.2	195.5	230.3
All Commodities[7]	119.1	119.3	117.5
Commodities Other than Farm & Foods[7]	125.2	125.2	125.3

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1958, 2,699,173; 1957, 2,559,490. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

THE BUSINESS TREND





	1958	1957	1956
Jan.	3 045	7,380	10.244
Feb.	3,684	8,373	12,163
Mar.	2.871	9,090	7,025
Apr.	3.572	3,164	8,803
May	....	3.994	3,667
June	....	2.974	4,748
July	....	4,332	4,140
Aug.	....	3,924	6,722
Sept.	....	2,337	3,057
Oct.	....	3,621	8,741
Nov.	....	2,832	3,986
Dec.	....	3.992	5,858

*Not including new orders for steel mill furnaces.
Industrial Heating Equipment Assn. Inc.
Charts copyright, 1958, STEEL.

	1958	1957	1956	1955
Jan.	174.5	259.3	245.5	140.9
Feb.	179.1	239.5	256.2	148.5
Mar.	173.7	262.4	276.5	172.8
Apr.	153.2	221.7	264.7	179.8
May	....	263.2	275.6	205.2
June	....	215.9	245.4	193.5
July	....	211.4	286.7	201.7
Aug.	....	225.8	219.5	217.6
Sept.	....	174.9	230.5	246.5
Oct.	....	207.0	299.8	227.6
Nov.	....	165.3	216.2	210.4
Dec.	....	150.8	235.7	245.5
Avg	....	216.4	254.4	198.3

American Gear Mfrs. Assn.

of capacity—that's 1,725,000 tons of steel for ingots and castings. This is the highest output since the week ended Dec. 22, 1957.

Freight carloadings continue to follow the seasonal pattern in response to greater iron ore and coal loading activity on the Great Lakes. Now at about the 565,000-car level, they should increase gradually through the month.

The main prospect for added strength in the index is output of electricity. It has been running at about 11.3 billion kw-hr since mid-May. It should expand at least 500 million kw-hr this month on the basis of a slight increase in industrial and commercial consumption and greater use of air conditioners.

Sober Thought—It would be easy to go overboard on this uptrend were it not for the almost certain decline during the summer months. This year the summer doldrums could be accentuated by three factors: 1. Early and prolonged shutdowns in the auto industry. 2. Early and prolonged vacations in many other manufacturing companies. 3. The possibility that much of the increase in the steel operating rate is caused by price hedging which would bring substantially lower output in July and August.

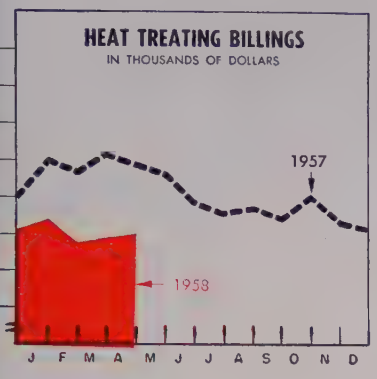
Consumer Buying Steady

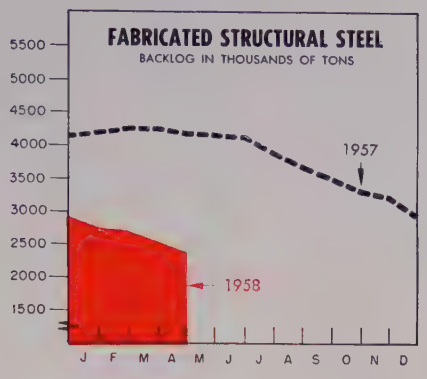
Economists at the Guaranty Trust Co. of New York feel that leveling out signs are now numerous and clear enough to form a "rather impressive pattern" for durables as well as nondurables. They point especially to the apparent stabilization of consumer buying.

"If consumer spending, which is the major component of GNP, has hit the bottom already, then the stage is being set for an end to the recession and for subsequent recovery of at least modest proportions," they claim. With stabilization at a high level relative to production, inventory reduction can proceed at a rapid pace without further downward adjustments in output.

Capital Outlays Off Again

Still the big question is: How far can the recovery go with spending for capital goods on the downtrend? The Securities & Exchange Commission's report on business spending plans released last week showed that businessmen have lowered their sights 4 per cent in the last three months. Now they plan to spend only $30.7 billion for plant and equipment this year, or 17 per





	1958	1957	1956
Jan.	2,780.4	3,533.9	3,116.4
Feb.	2,436.4	3,378.9	3,124.8
Mar.	2,495.4	3,631.8	3,330.9
Apr.	2,542.6	3,572.4	3,166.2
May	.....	3,311.4	3,350.7
June	.....	2,912.1	3,094.5
July	.....	2,767.5	2,737.4
Aug.	.....	2,830.8	3,136.6
Sept.	.....	2,708.8	2,858.6
Oct.	.....	3,021.6	3,468.5
Nov.	.....	2,641.4	3,238.2
Dec.	.....	2,565.4	2,998.9

Metal Treating Institute.

	Shipments		Backlogs	
	1958	1957	1958	1957
Jan.	316.7	290.1	2,778	4,194
Feb.	282.6	319.0	2,727	4,262
Mar.	336.6	342.4	2,542	4,245
Apr.	323.6	362.2	2,387	4,192
May	....	377.3	....	4,172
June	....	384.7	....	4,134
July	....	342.5	....	3,907
Aug.	....	383.8	....	3,707
Sept.	....	338.6	....	3,521
Oct.	....	384.8	....	3,322
Nov.	....	334.1	....	3,233
Dec.	....	320.2	....	2,959
Total	....	4,179.7		

American Institute of Steel Construction.

cent less than they did in 1957. By the third quarter, capital spending will reach an annual rate of $30.3 billion, compared with the record pace of $37.75 billion in last year's third quarter.

Who Should Buy Now?

The stability of consumer buying and the retrenchment of capital spending prompts James Dawson, vice president and economist of the National City Bank of Cleveland, to pass on the remarks of the president of a large food store chain:

"These campaigns to get the consumer to buy more give me a chuckle. He, or rather she, has never stopped buying. Some housewife with a sense of humor ought to picket the Chamber of Commerce and the National Association of Manufacturers with a sign reading: 'Are you businessmen buying now?' or maybe, 'We're not on a buyers' strike, but how about you?' "

Contractors Doing Well

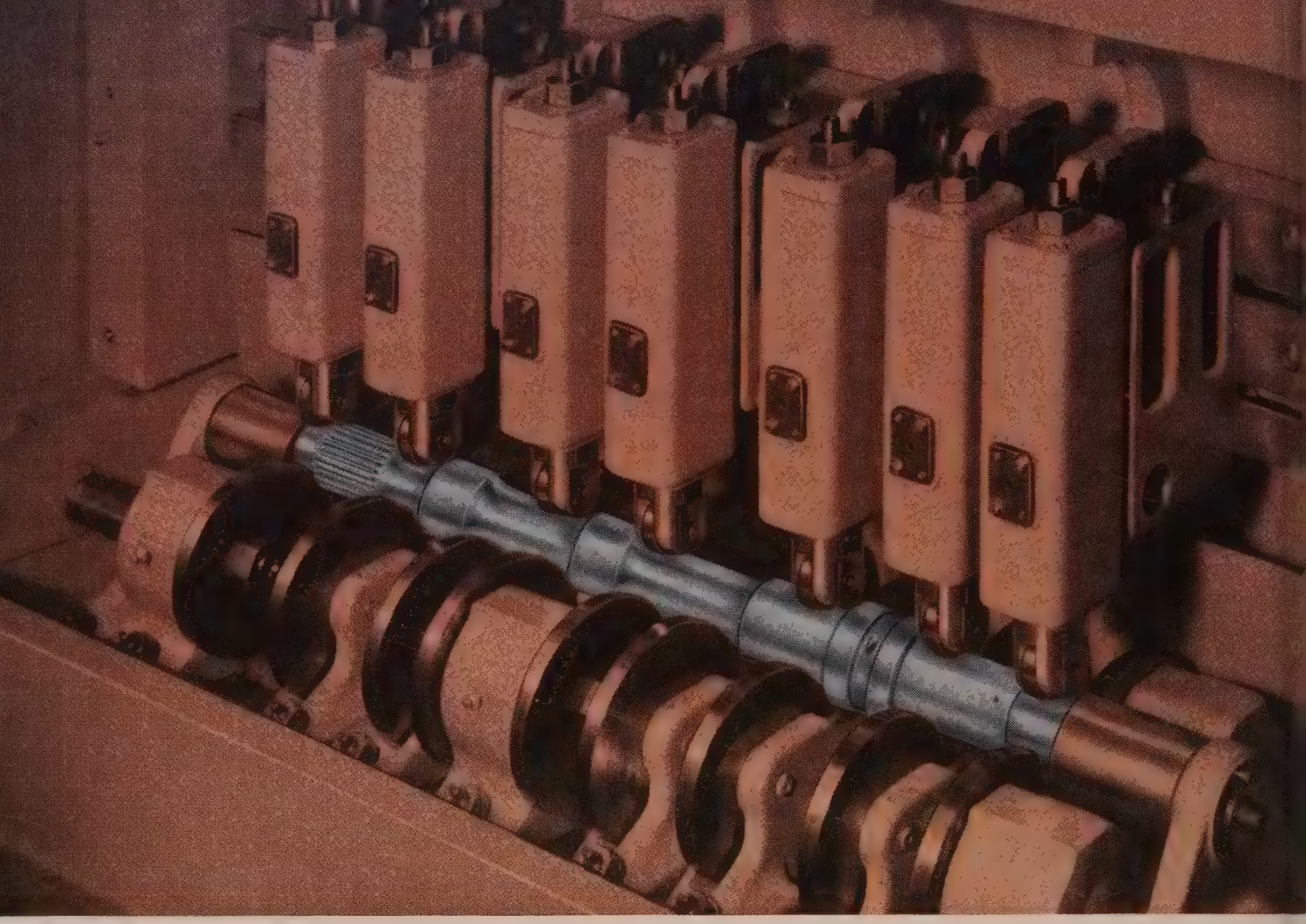
Construction reports continue to add grist to the optimist's mill. Construction put in place in May rose seasonally to $4.1 billion, up $400 million from the April total, report the Commerce and Labor Departments. This brings the 1958 cumulative total to $17.7 billion, compared with $17.6 billion in the like period of 1957. Physical volume is still behind that of 1957.

Contracts for new construction continue to show improvement, says *Engineering News-Record.* They totaled $481.3 million during the week ended June 5. After making a slow start, this year's cumulative totals have gradually closed in on the totals for last year and now lag by a mere 1 per cent.

Equipment Buying Lags

Reports from two major industry associations confirm the leveling off of the downtrend and the lack of zip in the metalworking industry. April orders for industrial furnaces totaled $3,572,000, says the Industrial Heating Equipment Association Inc. (See chart above.) While this is 24 per cent above the March figure, it is still only at the 1954 level with no upturn in sight, the association claims.

The Foundry Equipment Manufacturers Association noted a slight increase in April orders, but its index still reads at only 88.7 per cent of the 1947-49 base.



How to eliminate *your* shaft distortion problems

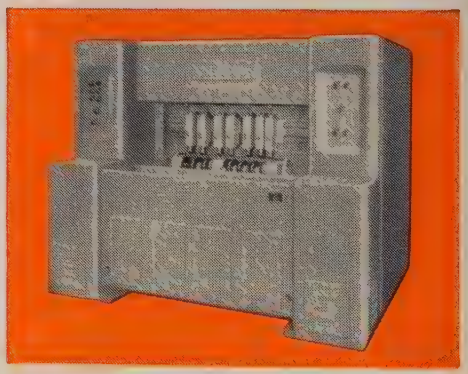
Distortion during hardening is a major production problem.

The Gleason No. 140 Rolling Quench Machine corrects this difficulty, because the quenching and straightening operations are performed at the same time. Because cold straightening is eliminated, valuable production time and expense are saved, and the quenched parts have less residual stress.

Shafts cannot distort because they are rolled under pressure throughout the quenching operation. The operator puts the hot part on the lower rollers and starts the machine. From there on, the quenching operation is automatic. Rolling speed, pressure, and oil flow are pre-set to suit the work that is being quenched.

The automatic quenching cycle saves operator time, and gives *uniform* results for all parts quenched. The pre-set metallurgically correct oil flow gives uniform hardness.

The Gleason No. 140 Rolling Quench Machine is equally suited for small or large quantities. It accommodates shafts $\frac{9}{16}''$ to 4″ in diameter, 6″ to 40″ in length, with integral cams or shoulders up to 8″ diameter. Tooling can be arranged to hold parts on diameters or centers. Unusual shapes can be handled with additional tooling. Write for further information.



The Gleason No. 140 Rolling Quench Machine also handles multiple quenching of short shafts.

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Builders of bevel gear machinery for over 90 years

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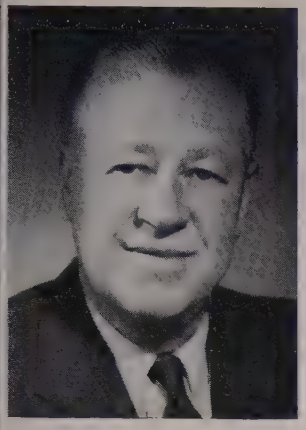
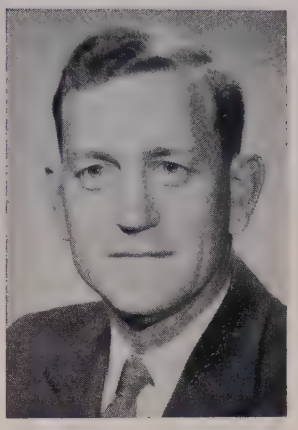


N. M. FORSYTHE
president of Natco

WILLIAM T. YLVISAKER
Parker-Kalon gen. mgr.

HERBERT W. FOSTER JR.
Champion Div. mfg.-mgr.



E. C. TROY
joins Pennsylvania Electric

N. M. Forsythe was elected president of **National Automatic Tool Co. Inc.**, Richmond, Ind. He was vice president and general manager. **Harry W. Bockhoff**, former president and chairman, continues as chairman. Before joining Natco in 1954, Mr. Forsythe was executive vice president, Pesco Products Div., Borg-Warner Corp.

William T. Ylvisaker was made general manager, **Parker-Kalon Div.**, General American Transportation Corp., Clifton, N. J. He succeeds **Eli Ogulnick**, resigned. Mr. Ylvisaker was vice president and general manager, commercial division, Pheoll Mfg. Co.

Gregory M. McKeown fills the new post of branch operations manager, machinery hydraulics division, **Vickers Inc.**, Detroit. He was manager, customer services.

Harry E. Eiber was appointed a vice president of **Austin Co.**, Cleveland. He has been manager of special steel industry projects since 1949, and since 1945 has also served as manager of the insulated building division.

George D. Potter, former executive vice president, was elected president of **Corey Steel Corp.**, Chicago. He succeeds **Earl W. Whiteway**, who announced semiretirement, remaining as vice president and consultant.

Ralph R. Luebke was elected vice president, **Modern Machine Works Inc.**, Cudahy, Wis., to succeed the late **Harold C. Hansen.** Mr. Luebke was treasurer and general manager.

Herbert W. Foster Jr. was promoted to manager-manufacturing, **Champion Div.**, Steel Improvement & Forge Co., Cleveland. Former supervisor of industrial relations, he succeeds **George D. Gotschall**, vice president, who will soon assume other administrative responsibilities for the company.

Charles J. Ramsburg Jr. was elected executive vice president, **Pittsburgh Gage & Supply Co.**, effective Sept. 1. He has served as manager of tubular sales for National Supply Co. since 1956.

Raymond E. Breitung was appointed sales manager of foundry products for **Kaukauna Machine & Foundry Div.**, Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. He co-ordinates foundry sales for the Kaukauna division and the recently acquired Menominee, Mich., foundry.

Donald D. Roberts, formerly a sales engineer for **Eaton Mfg. Co.**'s valve division, Battle Creek, Mich., was promoted to division sales manager. He succeeds the late **J. R. Stearns.**

E. Brooks Carter was elected president of **Wheeling Corrugating Co.**, Wheeling, W. Va., subsidiary of Wheeling Steel Corp.

Leslie P. Hawes was appointed operational manager of **Space Corp.**, Garland, Tex. He assumes supervision of engineering, procurement, manufacture, quality control, and field service divisions. Mr. Hawes retains the presidency of California Metal Spinning Co.

E. C. Troy joins **Pennsylvania Electric Steel Casting Co.**, Hamburg, Pa., July 1, as vice president-operations. For the last ten years, he has acted as a process consultant and manufacturer's representative. He previously served the steel casting industry in the Detroit and Philadelphia areas.

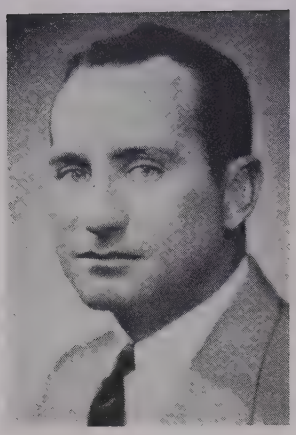
James W. Dunham was elected president, **Midwest Carbide Corp.**, Keokuk, Iowa, affiliate of Chemetron Corp. He succeeds **L. F. Loutrel**, elected to the new office of chairman.

William B. Jacobsen was named works manager of **Ceco Steel Products Corp.**'s new steel mill subsidiary, Lemont Mfg. Corp. The plant is under construction near Lemont, Ill. Mr. Jacobsen has temporary offices at Ceco headquarters in Chicago.

John W. Scallan was elected president, **Pullman-Standard Car Mfg. Co.**, Chicago. He succeeds **Charles W. Bryan Jr.**, retired. Mr. Bryan continues as a vice president of Pullman Inc.

Jack W. Swantz was made Pittsburgh district sales manager, **Wheelabrator Corp.** He succeeds **J. F. Underway**, who resigned to operate his own foundry in South Dakota. **John H. Burlingame** succeeds **Charles L. Benham**, retired, as district sales manager, Springfield, Mass.

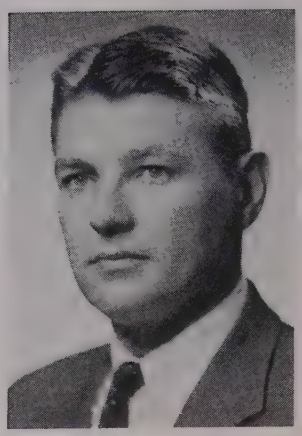
Oliver H. Fulton Jr. joined **General Dynamics Corp.**, New York, as director of program research, a new post. He was previously director



J. S. WADSWORTH

J. B. MEYER

officers of Littleford Bros. Inc.



JOHN W. GOSSELIN

W. CLARK ROOT

executive changes at Phoenix Mfg. and Graver Tank

of product planning for Underwood Corp.

Littleford Bros. Inc., Cincinnati, elected **J. S. Wadsworth** president; **R. S. Littleford**, chairman; **J. B. Meyer**, vice president and treasurer; **J. H. Albers**, secretary and assistant treasurer. Mr. Wadsworth was formerly with Wadsworth Watch Case Div., Elgin National Watch Co. Mr. Meyer continues as general manager.

Robert E. Latimer joined **Air Products Inc.**, Allentown, Pa., as assistant to vice president-engineering. **Robert L. Johnson** was made coordinator of management development.

Adm. Joseph J. Clark, USN, ret., was appointed assistant to the president of **Van Norman Industries Inc.**, New York. He co-ordinates scientific research and development among the eight manufacturing divisions.

Charles A. Mapp was named assistant vice president-sales, **Thrall Car Mfg. Co.**, Chicago Heights, Ill. He was assistant manager, railroad division, Fairbanks, Morse & Co.

American Electronics Co., Minneapolis, elected **Elmer J. Peterson Jr.** vice president-engineering; **A. E. Slindes**, vice president-production.

Duncan S. Grewar joined **Exomet Inc.**, Conneaut, Ohio, as sales engineer in the Chicago area.

Paul J. Pismato was made superintendent of **Kaiser Steel Corp.**'s plate mill, Fontana, Calif. **John F. Hoffman** was made superintendent, electricweld pipe mill there.

John W. Gosselin was elected president and chief executive officer, **Phoenix Mfg. Co.**, Joliet, Ill., and **W. Clark Root** was elected president and chief executive officer, **Graver Tank & Mfg. Co.**, East Chicago, Ind., recently acquired subsidiaries of Union Tank Car Co. They were executive vice presidents. Mr. Gosselin succeeds his father, **Edward N. Gosselin**, who moves up to chairman of Phoenix, and continues as chairman of Graver. Mr. Root succeeds **Jalmer H. Swanson**, now vice chairman of Graver.

Chester O. Wanvig Jr. was elected president, **Globe-Union Inc.**, Milwaukee. He succeeds his father, who continues as chairman.

Willard J. Schacter was named vice president and general manager, **Roryare Mfg. Co.**, San Diego, Calif.

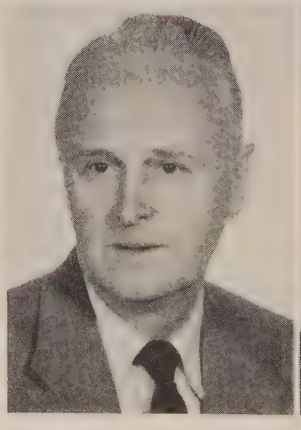
National Acme Co., Cleveland, appointed **J. L. Molner** to chief engineer; **H. C. Matlock**, administrative engineer; **B. C. Butler**, general superintendent. Mr. Molner was general superintendent.

Dr. Kuang Lu Cheng, formerly of Westinghouse Electric Corp.'s materials engineering department, East Pittsburgh, was appointed associate director of research, **Utica Metals Div.**, Kelsey-Hayes Co., Detroit. **Dr. Adolph Palty** was made supervisor, alloy development and evaluation. He was with the Thomson Laboratory of General Electric Co., Lynn, Mass.

Robert B. Meneilly was appointed manager of tin plate products for **United States Steel Corp.**, Pittsburgh. He succeeds **J. C. Whetzel**, retired. Mr. Meneilly was assistant manager.

Ralph F. Dorshimer was appointed chief engineer, **Treadwell Engineering Co.**, Easton, Pa.

B. E. Phillips was appointed general sales manager, industrial truck division, **Clark Equipment Co.**, Battle Creek, Mich. He replaces

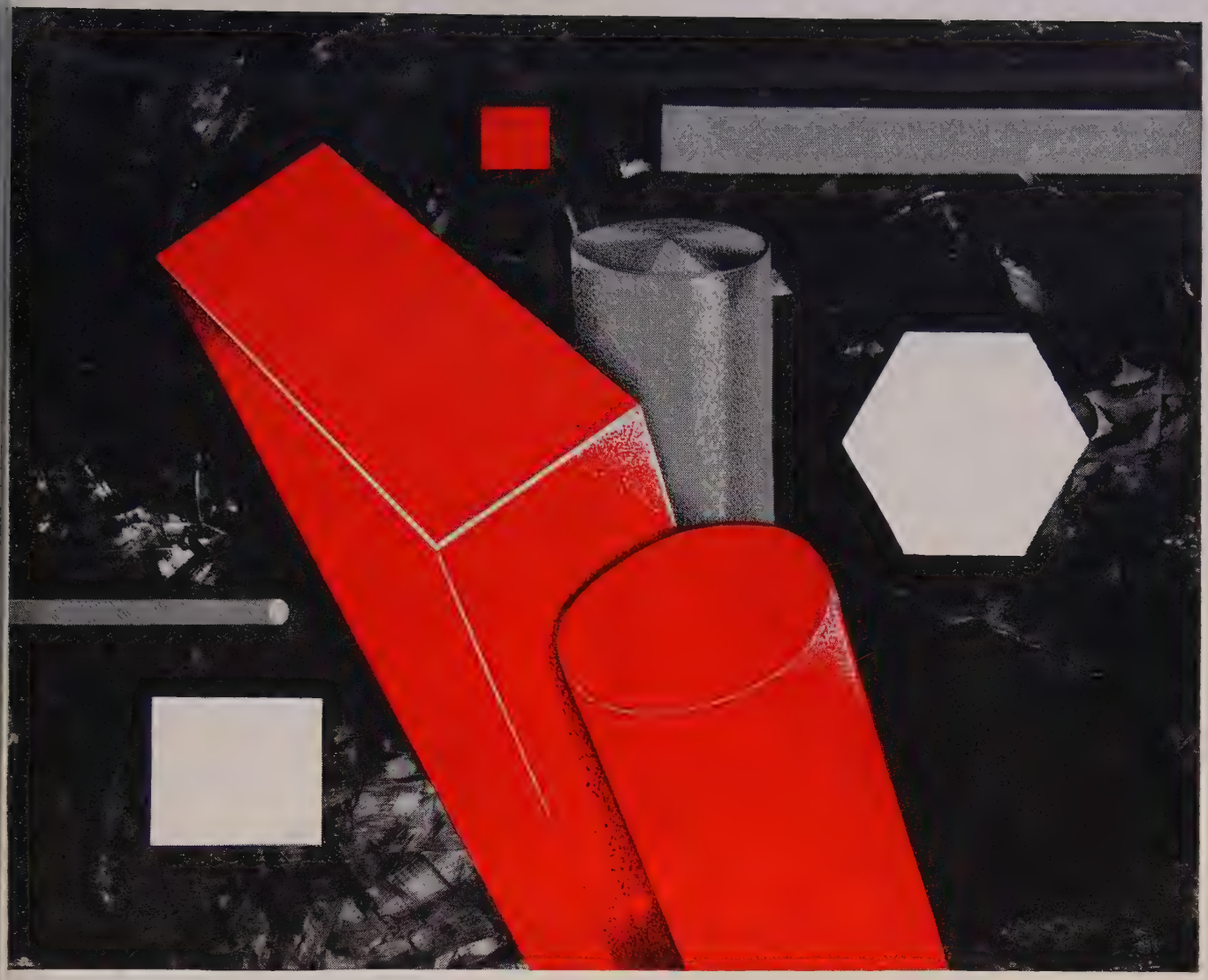


J. L. MOLNER

H. C. MATLOCK

B. C. BUTLER

National Acme promotions



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Plan now to combine the production-boosting benefits of a steel service center with a full line of quality-controlled products from United States Steel. For instance, you can get these USS Carilloy Steel products at your nearby steel service center: blooms, billets, slabs, bars, bar shapes, spring flats, plates, sheets, strip, special sections, structural shapes . . . any form, specification, condition or quality you need.

Remember, as a part of the American Steel Warehouse Association, your steel service center has been set up specifically to handle your immediate steel demands. So the next time you order alloy steel from your steel service center, be sure to specify *USS Carilloy Steels.*

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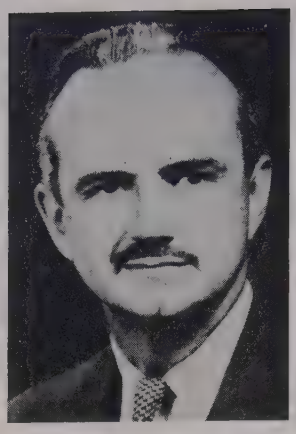
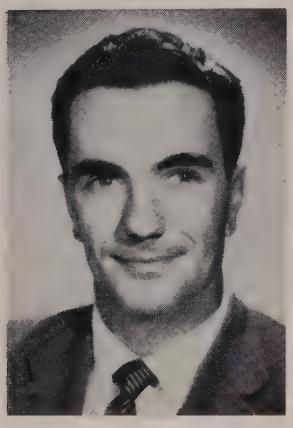
USS United States Steel

J. B. MURTLAND JR.
Allegheny Ludlum dept. mgr.



ROBERT C. BAUMGARTNER
Oster Mfg. v. p.

ELDON W. MENKE
new post at Edward Valves



GRANT A. MORRISON
GE Metallurgical Products post

GEORGE R. GOSS
Republic-Gadsden plant post

LESLIE E. McALISTER
Rolled Steel div. mgr.

L. A. DePolis, resigned. Mr. Phillips was assistant sales manager.

Grant A. Morrison, former engineering administrator, was named manager of product design and application engineering at the **Metallurgical Products Dept.,** General Electric Co., Detroit.

George R. Goss was made general superintendent, hot and cold strip mills, at **Republic Steel Corp.'s** Gadsden, Ala., plant. He was assistant superintendent of the cold strip mill in Cleveland. The Gadsden hot and cold strip mills continue under direction of their respective superintendents, **E. H. Callahan** and **J. J. Lloyd,** with Mr. Goss having over-all supervision.

George Hankamp was appointed to the production supervisory staff of **Moto-Mower Div.,** Detroit Harvester Co., in Richmond, Ind. He was in charge of production control at Jarecki Corp.

Allan L. Prentice was elected vice president, **Rochester Iron & Metal Co.,** Rochester, N. Y.

Leslie E. McAlister was appointed manager, special products division, **Rolled Steel Corp.,** Skokie, Ill. He was manager of strip sales.

Bruce T. Clarke was named divisional sales manager of **Pfaudler Co.,** Rochester, N. Y., division of Pfaudler Permutit Inc.

J. Philip Starbuck was elected vice president-industrial relations, **Controls Co. of America,** Schiller Park, Ill. He was director of industrial relations.

Ralph E. Schneider was elected secretary and treasurer, **Anaconda Co.,** New York. He succeeds **C. Earle Moran,** retired. He was assistant secretary and assistant treasurer of Anaconda and several of its subsidiaries. **Thomas E. Tatem** and **Frank M. Byrnes** were each elected assistant secretary and assistant treasurer of Anaconda.

Gordan Williams was appointed assistant works manager, **Farrell-Cheek Steel Co.,** Sandusky, Ohio. He was formerly with West Steel Casting Co., Cleveland.

J. B. Murtland Jr. was promoted to manager, electromechanisms department, at the Brackenridge, Pa., Works of **Allegheny Ludlum Steel Corp.** He was supervisor of the department's design application.

Robert C. Baumgartner, former general sales manager, was elected vice president of **Oster Mfg. Co.,** Wickliffe, Ohio. **Clare R. Metcalf** was made sales manager, continuing as secretary. **Richard Humiston** was elected treasurer. He was formerly executive vice president, assistant secretary of Cyril Bath Co.

Edward Valves Inc., East Chicago, Ind., subsidiary of Rockwell Mfg. Co., appointed **Eldon W. Menke** to the new post of manager of tool and plant engineering. He was plant engineer.

Southwestern Industrial Electronics Co., Houston, a division of Dresser Industries Inc., appointed **Warren C. Dunn** assistant to the executive vice president. He was with Union Switch & Signal Div., Westinghouse Air Brake Corp. Product managers for each area of SIE interests are: **Louis B. McManis,** geophysical division; **Frank C. Smith Jr.,** instrumentation division; **Newton E. Armstrong,** control division; **Robert L. McCelvey,** government contract division; **Albert B. Dustin,** intercompany and heavy manufacturing division.

Stanley B. Roboff was named director of marketing, a new post at **Sylvania-Corning Nuclear Corp.,** Bayside, N. Y. Assistant director of marketing, responsible for the northern region, is **Leonard Smiley.** Marketing manager, eastern region, is **Dr. Charles I. Whitman.** Marketing manager, western region, is **James O. Vadeboncoeur.**

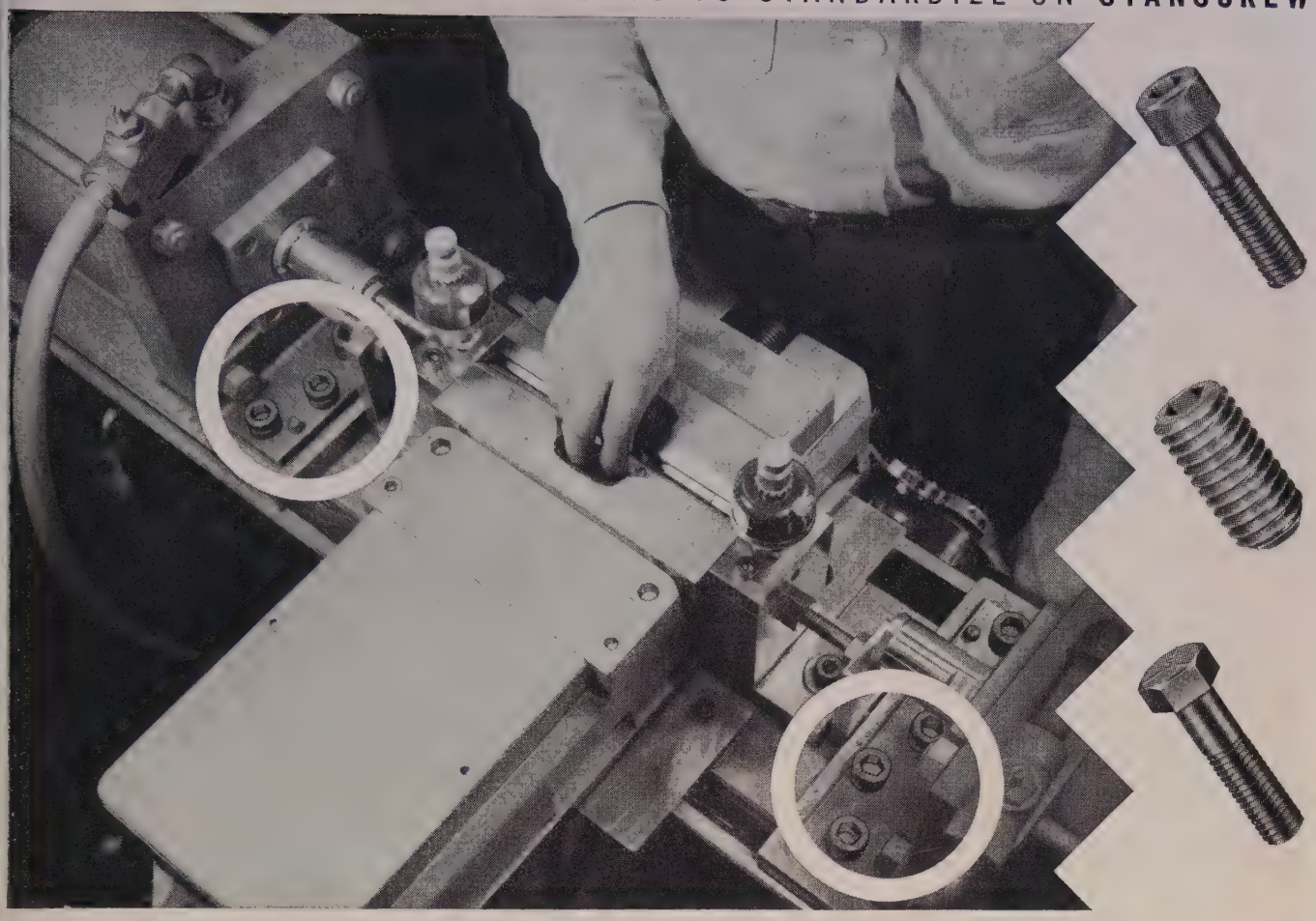
OBITUARIES...

Benjamin N. Ackerman, 62, manager of the methods and standards department, **Buffalo Forge Co.,** Buffalo, died May 31.

Fred C. Dull, 63, vice president-treasurer, **Monarch Machine Tool Co.,** Sidney, Ohio, died June 1.

Charles A. Reif, founder and former chairman and president, **Reif-Rexoil Inc.,** Buffalo, died May 25.

IT PAYS TO STANDARDIZE ON **STANSCREW**



A 20-ton impact load . . . 14,400 times a day! Stanscrew Fasteners solve the problem

Fastening the air cylinders on this tube former is a real problem. Each of these 8″ bore cylinders delivers a thrust of over 20 tons every time the machine is operated. And since this happens 14,400 times in a normal working day, ordinary fasteners would soon fail under these repeated shock loads. Furthermore, not even the slightest misalignment can be tolerated in this machine.

The Stanscrew fastener specialist was able to quickly answer this demanding problem. His solution was Stanscrew Socket Head Cap Screws, tightened to within 80% of yield strength so they remained in tension. These fasteners, so applied, deliver a clamping force that eliminates the shock feature of this extremely high loading . . . and provides a 100% factor of safety.

Tough assignments like this are everyday jobs for your Stanscrew fastener specialist. Immediately on call, through your Stanscrew distributor, he can bring to your problem years of specialized experience. And, back of him, is an outstanding staff of engineers who have been solving the fastener problems of American industry since 1872.

Stanscrew's complete line of more than 4,000 different types and sizes will provide economical answers to your fastener requirements. All 4,000 items are always in stock, quickly available.

Call your Stanscrew distributor today for solutions to your fastener problems. He will arrange a prompt meeting with the Stanscrew fastener specialist . . . who can often suggest ways to save you money by substituting standard fasteners for costly specials.

STANSCREW FASTENERS

CHICAGO | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HMS | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
WESTERN | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

STANDARD SCREW COMPANY 2701 Washington Boulevard, Bellwood, Illinois

ESCO Spuncast®, a centrifugal casting process for making symmetrical, tubular parts, is especially adapted to the manufacture of nuclear stator shells, piping and scram rods, for atomic power installations.

The Stator shell (illustrated), used to make "canned" or hermetically sealed pump motor housings, is a 1,300-lb. Spuncast casting. The "built-in hole" saves countless hours of machining time as well as substantial savings in waste metal.

Cast to rigid specifications (MIL-S-18262, Class 1, 100% dye penetrant and radiograph inspected to ASTM E71 class 2, standard), these stator shells are typical of the exacting metallurgical jobs handled economically every day at *ESCO*. The Spuncast process is only one of several processes available at *ESCO*.

Call your nearest ESCO representative today for details. Ask for your free copy of "How to Cut Costs With ESCO Spuncast", a 12-page brochure, or write direct.

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Offices in Most Principal Cities
ESCO INTERNATIONAL, NEW YORK, N. Y.
IN CANADA ESCO LIMITED

Timken Allots Millions for Expansion

Five-year program totals $51 million. New equipment to boost output of domestic and foreign plants. Firm expects to get new Australian plant in production soon

TIMKEN Roller Bearing Co., Canton, Ohio, will invest $51 million in new equipment and facilities during the next five years. The appropriations are planned to improve the firm's products and productivity and to maintain a strong competitive position.

Grinding, Finishing — More than $3 million worth of grinding and finishing equipment has been ordered for installation in plants at Canton, Columbus, and Bucyrus, Ohio. An additional $2.5 million will be spent for such equipment, increasing grinding and finishing productivity by an anticipated 30 per cent.

A survey of new green machining equipment is underway to determine the number of new machines needed. Single spindle and multi-spindle screw machines will be replaced with machines using carbide tooling, similar to those installed at the highly mechanized Bucyrus bearing plant, but capable of machining a greater range of bearing sizes. About $3.5 million will be spent for new screw machines.

Roller header machines will be modernized at a cost of $400,000 with the work to be completed within the next two years. Over the next five years, $1 million will be spent for heat treating equipment at Canton and Columbus. Additional funds ($16,250,000) are earmarked for a variety of other capital improvements in the bearing and rock bit plants to be spent at the rate of about $3,250,000 a year.

Steelmaking — Outlays for new equipment and modernization of machinery in the Steel & Tube Div. plants will total $12.5 million. Included are a new top charge furnace, an additional electric stirrer, and a new piercing mill. The new equipment will increase capacity and provide greater flexibility in product scheduling.

Timken has allotted about $12.5 million for expansion of and improvements in its foreign operations during the next five years. The new Australian plant will receive its first shipment of machinery early this month. Grinding and finishing operations should start sometime this summer.

Tyson Bearing Expanding

Tyson Bearing Co. has launched a $1.2-million expansion and improvement program at its Massillon, Ohio, plant. This is the first phase of a long-range expansion project planned by this division of SKF Industries Inc., Philadelphia.

The immediate program involves purchase of equipment, construction of an 18,000 sq ft addition to production areas and 2000 sq ft to office spaces, and removal of some existing buildings.

Speeds Shipments

Shipments of fabricated aluminum from Reynolds Metals Co.'s alloy plant at Listerhill (Sheffield), Ala., have been speeded since a recently completed 15,000 sq ft building has been put into use. It is the first major unit to be completed in the current expansion program.

Hooker Decentralizes

Durez Plastics Div., Hooker Chemical Corp., Niagara Falls, N. Y., has been decentralized and will operate as an autonomous division. The facilities involved and products made at each are: The division's headquarters plant at North Tonawanda, N. Y., synthetic resins and molding compounds; the Kenton, Ohio, plant, phenolic molding compounds; and the Spokane, Wash., plant, wood flour (a major additive in many molding compounds).

Foundry Forms Division

Electric Steel Foundry Co., Portland, Oreg., formed an Industrial Div., headed by Dale P. Minyard, at its Danville, Ill., plant to handle product development and manufacture, and custom and repair fabrication. Facilities include equipment for welding, pressing, forming, burning, heat treatment, and nondestructive testing.

Pesco Establishes Branch

Pesco Products Div., Borg-Warner Corp., Bedford, Ohio, established a branch at 14542 Ventura Blvd., Sherman Oaks (Los Angeles), Calif. It will design, develop, and produce special purpose, alternating current, generating equipment. R. B. Harlan Jr. is general manager of the western branch; A. T. Puder, operations manager. A 20,000 sq ft combined manufacturing and engineering facility for the branch will be built in the Burbank, Calif., area.

Bostrom Changes Name

Bostrom Mfg. Co., Milwaukee, changed its name to Bostrom Corp.

Welding Firm Reorganizes

Reorganization of American Welding & Mfg. Co. and appointment of parallel operating and sales personnel at its plants in Warren and Niles, Ohio, have been announced. F. J. Shanaberg is manager of sales for the Industrial Div. plant at Warren which specializes in weldments in steel and other metals and which provides welded rings for jet engine manufacturers. The Niles plant will operate as the Building Products Div. to produce an expanded line of steel doors and frames. G. E. Stalle has been named general manager of this division; J. R. Doran, field sales manager.

Hercules Buys Engine Line

Hercules Motors Corp., Canton, Ohio, purchased Hall-Scott Inc.'s Engine Div. of Berkeley, Calif.

Raytheon Ups Research

Microwave & Power Tube Div., Raytheon Mfg. Co., Waltham, Mass., plans to lease a 150,000 sq ft electronic laboratory building to be built on Route 128, Burlington, Mass. It will house the Beam Tube Laboratory and the Microwave Power Tube Research & Development Laboratory.

Raytheon also plans to erect an

80,000 sq ft electronic laboratory building for its Government Equipment Div. on Route 20 in Sudbury, Mass. It expects to use it for radar development and environmental tests.

Fuller Brush To Build

Fuller Brush Co., Hartford, Conn., will build a $5.5-million plant in East Hartford, Conn. It will provide about 360,000 sq ft of manufacturing, storage, warehousing, and office space.

Distributor Expanding

Taylor Products Corp., successor to the steel distributing firm of Taylor & Spotswood Co., San Francisco, will build larger office and warehouse facilities at Burlingame, Calif.

Du Pont Opens Laboratory

E. I. du Pont de Nemours & Co. opened its $5-million laboratory at Wilmington, Del. Besides providing service to customers, it will be used for evaluation of new or improved products of the Electrochemicals and Pigments Departments. The laboratory contains 81,000 sq ft of floor space.

ASSOCIATIONS

American Supply & Machinery Manufacturers Association Inc., Cleveland, elected these officers: President, L. H. Bellows, Sheldon Machine Co. Inc., Chicago; first vice president, F. C. Emerson, Spartan Saw Works Inc., Springfield, Mass.; second vice president, S. D. Conant, Jacobs Mfg. Co., West Hartford, Conn.; secretary, Clare Payne, Safety Socket Screw Co., Chicago; and treasurer, P. A. Johnson Jr., Dake Corp., Grand Haven, Mich.

Smith Bolton, U. S. Graphite Co., Saginaw, Mich., has been named treasurer of the **Powder Metallurgy Parts Manufacturers Association,** Pittsburgh.

Society of Reproduction Engineers has established national headquarters at 1150 Griswold St., Detroit 26, Mich., under the direction

IN PLANTS, where mazes of pipes and other underground installations make the placement of ducts or buried cable costly or difficult, aerial cable solves the problem.

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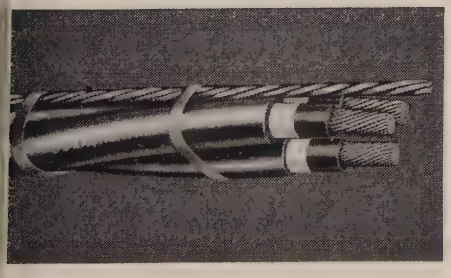

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of Carl G. Sedan, executive vice president. James A. Catto, Ford Motor Co., Dearborn, Mich., is president.

CONSOLIDATIONS

A. P. Green Fire Brick Co., Mexico, Mo., acquired **Stevens Fire Brick Co.**, Macon, Ga., maker of super, high, and medium duty fire brick. Robert McIntosh is manager of the Stevens company operation.

Cutler-Hammer Inc., Milwaukee, acquired **Airborne Instruments Laboratory Inc.**, Mineola, N. Y., and will operate it as the Electronics Div. AIL specializes in the application of electronics to radar, microwave, data-processing equipment; design, and production of systems for the military and industry; and research and design in the medical and biological physics field. A 160,000 sq ft plant is being built for the division at Melville, N. Y.

Yuba Consolidated Industries Inc., Benicia, Calif., purchased **Weber Engineered Products Inc.**, Cincinnati, manufacturer of outdoor power equipment.

Addressograph-Multigraph Corp., Cleveland, purchased **Stott & Hoare (Pty) Ltd.**, Melbourne, and **Stott & Morley (Pty) Ltd.**, Sidney, Australia, and will establish a wholly owned subsidiary in Australia about July 1. D. L. Zerkel will be managing director with headquarters in Melbourne.

Thomas & Betts Co., Elizabeth, N. J., acquired **Kent Mfg. Corp.**, Newton, Mass., manufacturer of electrical terminals in continuous strip form and related attaching machines. Officers of T&B's new subsidiary are: President and treasurer, N. J. MacDonald; executive vice president, C. A. Badeau; vice president and general manager, H. D. Batcheller.

Grayson Equipment Co., Elizabeth, N. J., acquired control of **Straus-Duparquet Inc.**, New York, producer of food service equipment, supplies, furniture, and furnishings for the institutional field, and man-

ufacturer of commercial refrigerators and fixtures for retail stores. Facilities are being consolidated and will be operated under the name of Straus-Duparquet Inc.

Hein-Werner Corp., Waukesha, Wis., purchased **Tal Bending Equipment Inc.**, Milwaukee, manufacturer of pipe bending equipment.

NEW OFFICES

Leschen Wire Rope Div., St. Louis, and **Quaker Rubber Div.**, Philadelphia, **H. K. Porter Company Inc.**, opened a joint sales and service branch at 450 Second St., New Kensington, Pa.

Lincoln Electric Co., Cleveland, opened district offices in Memphis, Tenn., under R. W. Thomas as manager, and in Albany, N. Y., under R. S. Hale as manager.

NEW ADDRESSES

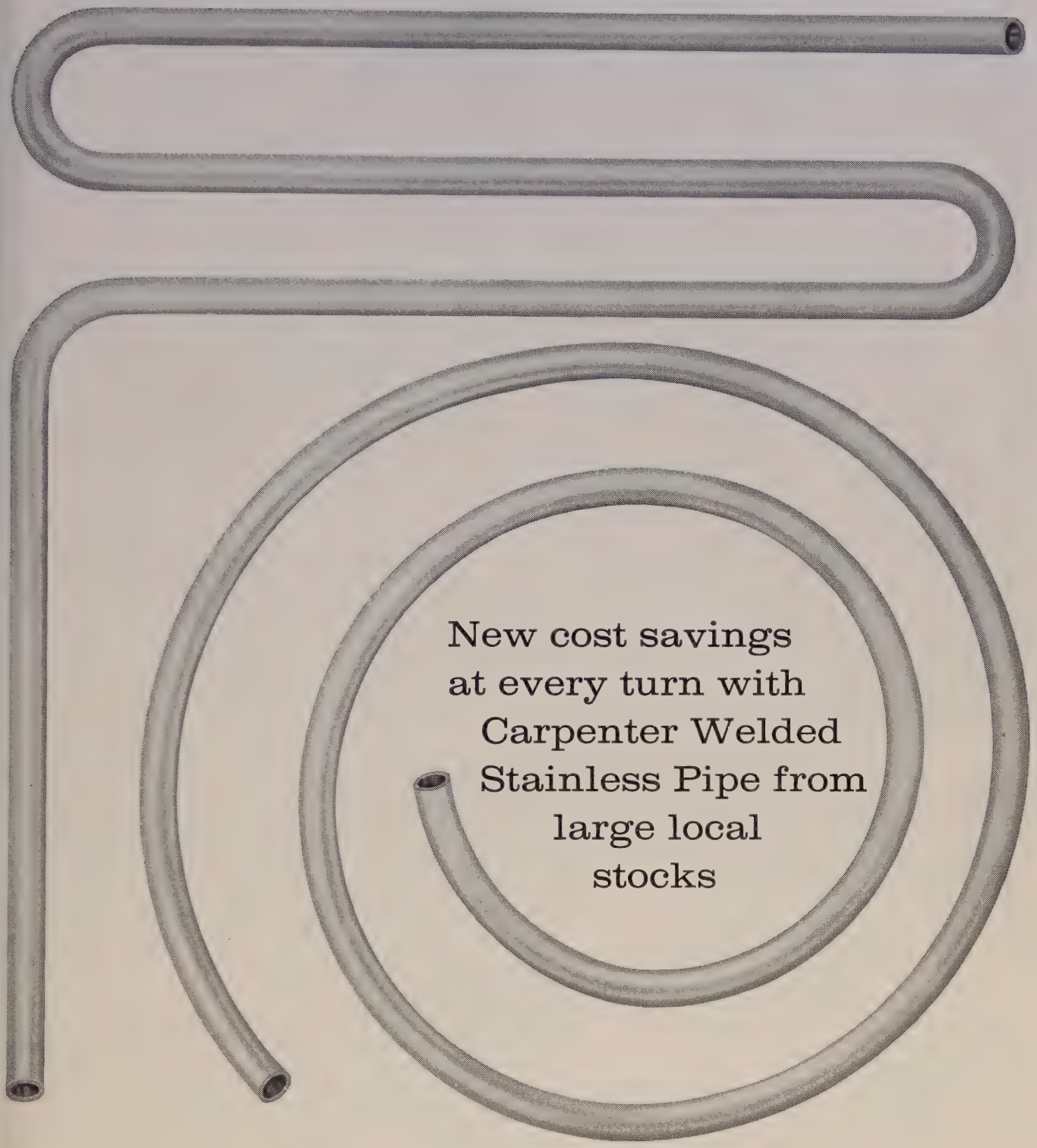
Reynolds Metals Co. moved its sales headquarters to Richmond, Va. This move brings together in Richmond "all of our headquarters managerial functions, including manufacturing, marketing, advertising, research, and corporate groups," says David P. Reynolds, executive vice president for sales. Unaffected by the move are seven Reynolds aluminum fabricating plants in Louisville.

The central office of **Borg-Warner Corp.** was moved to 200 S. Michigan Ave., Chicago 4, Ill.

End Mill Div., Eclipse Counterbore Co., moved from North Branch, N. J., to the main Eclipse plant at Ferndale, Mich. R. A. Parent is in charge of the division.

F. C. Russell Co. moved its executive and general offices to Columbiana, Ohio. The firms makes aluminum doors, windows, and similar products.

Headquarters for the staff of **Westinghouse Electric Corp.'s** privately financed nuclear materials testing reactor has been moved to



● Not only in initial cost does Carpenter Stainless Pipe save you money. Every step from installation through extra long service life will show Carpenter's superiority. The uniformity of Carpenter welded stainless pipe adds even more operational benefits no matter which schedule you select . . . 5, 10 or 40. Carpenter makes all three. Your local distributor can supply your needs from stock. He can give you fast delivery. For complete ordering information write for Carpenter's Selecting and Buying Guide. The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

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Stainless Pipe

Waltz Mill, Pa. E. T. Morris is manager.

NEW PLANTS

Linde Co., a division of Union Carbide Corp., New York, will build a liquid oxygen and nitrogen plant at Pittsburg, Calif., to meet expanding needs of missile and other industries on the West Coast. The first section with a capacity of 115 million cu ft a month will begin production as early as June 1, 1959; additional equipment with capacity of more than 105 million cu ft a month will go on stream a few months later.

Chain Belt Co., Milwaukee, plans to build a heavy machinery manufacturing plant at Madison, Ind. Operations now carried on at Niles and Newton Falls, Ohio, and Rock Island, Ill., will be consolidated at Madison.

Borden Metal Products Co., Elizabeth, N. J., is constructing a plant at Conroe, Tex., to produce grating. It is scheduled to start operations about Sept. 1.

Ampco Metal Inc., Milwaukee, dedicated its $250,000 foundry and southwestern sales center at Garland, Tex. It is equipped to produce bronze castings ranging up to 2000 lb and higher. Ray J. Severson is manager of the Garland operation.

Ipsen Industries Inc., Rockford, Ill., moved its Ceramic Div. into a new plant in Pecatonica, Ill. High temperature, high density porcelain specialties will be produced in the new 15,000 sq ft facility. The plant includes laboratory facilities for research in metallurgy, ceramics, and cermets, says Don Bissell, general manager.

Ladish Co., Cudahy, Wis., opened a manufacturing plant, sales service office, and warehousing facilities (Ladish Co. Texas Div.) at 1301 W. Belt Dr. N., Houston, Tex.

Computer Dept., General Electric Co., Phoenix, Ariz., is building a $1 million, 104,000 sq ft plant in that city.

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THE LEE WILSON OPENED COIL ANNEALER . . . a high-volume continuous coil annealing furnace that has all the advantages of continuous strand annealing with none of the disadvantages. It requires far less area and installation costs. It is easier to maintain. It anneals with a uniform thoroughness unmatched by any other method. *It exposes 400 times more area to heating than conventional coil furnaces* and delivers greater tonnages than modern day continuous furnaces. Its operating costs per ton are much less.

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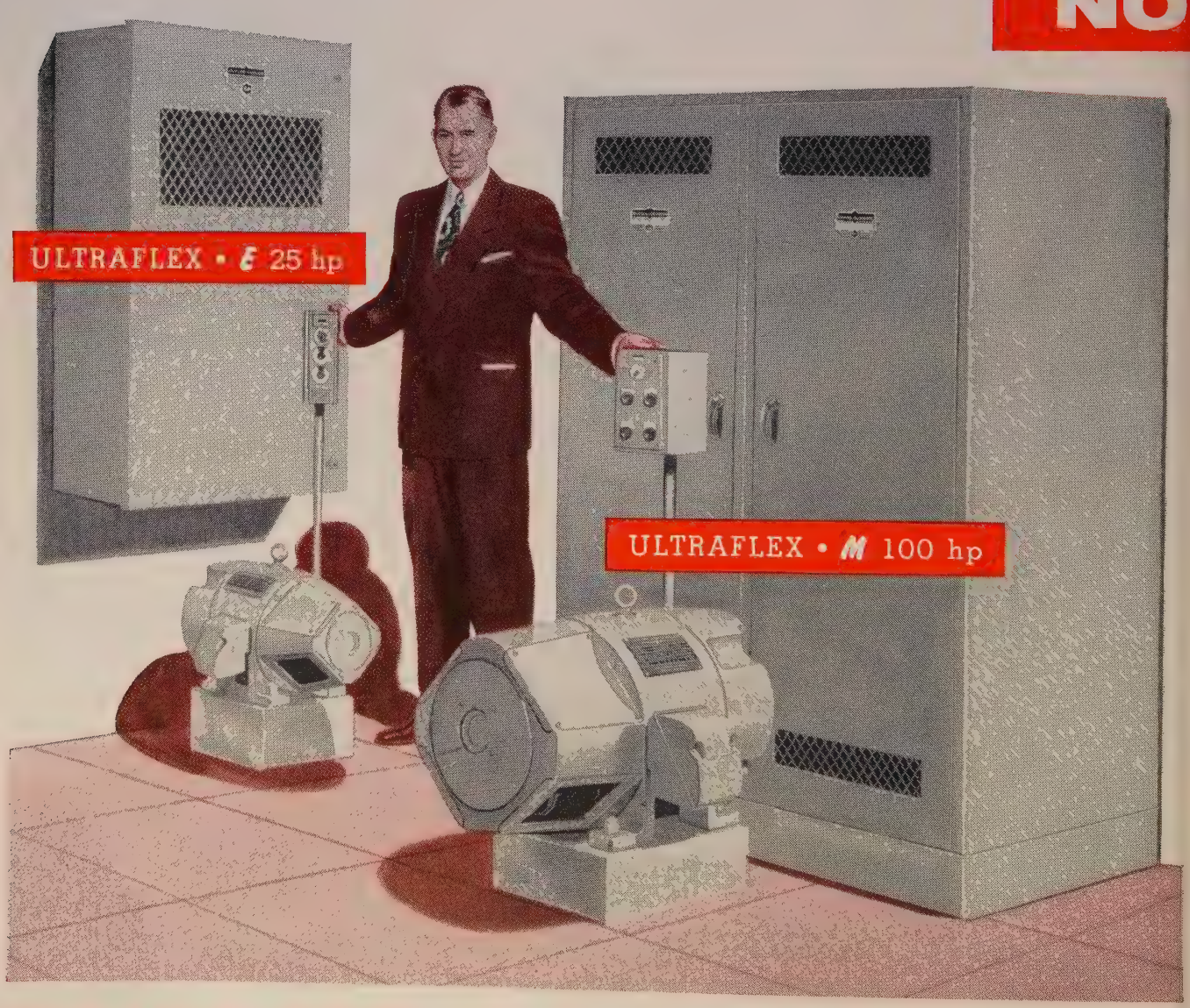

WHAT'S NEW IN PACKAGE DRIVES . . .

Cutler-Hammer Ultraflex Packaged Drives provide outstanding savings in installation, operation, and maintenance

NO MOVING PARTS!

Ultraflex Adjustable Speed Packaged Drives offer new opportunities for quick, cost-cutting installations. Light, compact static power conversion components have replaced the conventional m-g set resulting in substantial savings in size and weight. Ultraflex Packaged Drives save up to 50% in valuable floor area . . . up to 75% in weight permitting rapid installation or rearrangement of production machinery without special handling equipment or floor loading preparations. Also, Ultraflex units require no balancing or alignment attention during installation.

Ultraflex Adjustable Speed Packaged Drives provide a new high standard of operational efficiency, ultra-responsive speed control, and ultra-precise speed regulation. No special A-c power supply is required and the exclusive Ultraflex static power conversion systems guarantee greater efficiency than ever possible with conventional drives. Further, every Ultraflex Packaged Drive works perfectly without forced ventilation which means less power is consumed as unwanted heat. Also, Ultraflex Packaged Drives are noise and vibration free.

Dependable, maintenance-free performance is one of the outstanding achievements of the all new Cutler-Hammer Ultraflex Packaged Drives. With the Ultraflex static power conversion system, there are *no* bearings to lubricate or replace when worn. There are *no* commutators to service, *no* brushes to replace periodically. There are *no* shafts to align, *no* couplings to maintain, *no* inertia loads to balance. There are *no* forced ventilation fans, *no* filters to clean or change. Ultraflex circuit components are inherently rugged and trouble-free.

Cutler-Hammer Ultraflex Packaged Drives are available in two forms . . . Ultraflex E—the 1 to 40 hp, low cost electronic type adjustable speed drive and Ultraflex M—the 1 to 200 hp, ultra-efficient magnetic amplifier type adjustable speed drive. Both forms come complete with the Ultraflex control unit, heavy-duty D-c drive motor, and operator's control station. Standard Ultraflex Packaged Drives provide an 8 : 1 speed range with wider ranges available upon request. Cutler-Hammer also provides a complete engineering service which will custom-design a static powered adjustable speed packaged drive to meet your specific requirements. Write today on your company letterhead for the new descriptive bulletins EN64-Ultraflex E and EN65-Ultraflex M. CUTLER-HAMMER Inc., 1211 St. Paul Ave., Milwaukee 1, Wisconsin.

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Coming July 14

Finding Out What Customers Will Buy

The new concept of marketing rests on knowing what the customer will buy, what price he will pay, when he wants the product, and in what size and color.

STEEL's next Program for Management article, July 14, will point out how the customer, sometimes neglected in boom periods, is all important. The company that expects to make a profit will have to get to know him and his wants better. The July 14 story will tell how.

Published so far in the 1958 series:

1. **Balancing Management for Profit (Feb. 17, p. 113)**
2. **Production Control for Profits (Mar. 17, p. 83)**
3. **Managing Defensework for Profit (Apr. 14, p. 125)**
4. **Building a Labor Contract (May 19, p. 125)**
5. **Pricing for Profit (June 16, p. 87)**

Extra personal copies of these Program for Management articles are available until the supply is exhausted. Write: Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

Pricing for Profit

ABOUT 5000 price quotations appear in this and every issue of STEEL. Normally, 50 to 75 change weekly; as many as 500 will shift in a week after a big price decision, such as a basic steel increase.

Multiply those figures by at least 1000, and you'll get an idea of the size of metalworking's pricing job. Who does it—and how? What about the quality of the performance? How can it be improved?

Those are questions plaguing executives today as our whole pricing structure comes under unprecedented public scrutiny. Congress investigates it; many unions damn it as too high; many stockholders hit it as too low.

Sound, straightforward pricing is the way to weather such attention. It has always been the way to maximize your profits.

Is Pricing a Science?

Roger Blough, chairman of U. S. Steel Corp., says: "Competition, both present and future costs, and the appeal of President Eisenhower were the main factors determining our 1957 price rise in steel." He could have named several other main factors (including customer reaction, and inadequate return on investment) and a score of minor considerations.

U. S. Steel's case is typical because pricing is scarcely an exact science. Ford Motor Co.'s chairman, Ernest R. Breech, started a talk entitled "The American Method of Pricing" by saying: "There isn't any."

That's why your attack on the problem should start with the man or men who will make your pricing decisions. Methods used to arrive

The Ten Approaches to

There are ten basic species of pricing politicians and strategists, says Donald D. Couch, vice president of marketing and commercial development for American Radiator & Standard Sanitary Corp., New York. His list:

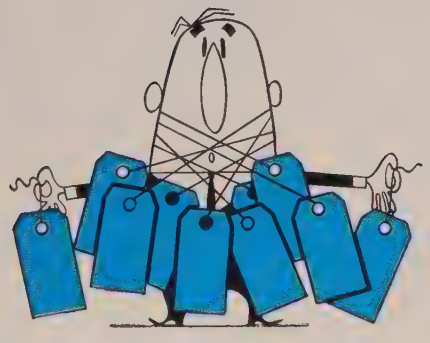
1. **THE TAGALONG SCHOOL.** Tagalong gets all his competitors' price sheets and matches his price exactly in line with that of his most significant competitor. He often does so with no regard to other factors. He might even ignore the possibility that his competitor had only previously imitated his price. His song: "We gotta meet competition."

2. **THE EINSTEIN TYPE.** This advanced mathematician and superb chartist draws trend lines by the method of least squares, weights averages, plots standard deviation; he derives his pricing conclusions from the magical point on the chart where the lines intersect. Although you need facts and figures, the Einstein type is too often ostrichlike in his unwillingness to recognize external and seemingly extraneous influences in the pricing picture.

3. **THE RATIO SPECIALIST.** To him a previously established gross profit percentage goal is sacrosanct. Occasionally, he may deviate slightly and focus on a return-on-investment ratio. Ratios have their place, of course. The problem arises when they become inflexible and sacred.

4. **THE TRADITIONALIST.** He contends that his company has successfully priced in a certain manner for years—and has been paying regular dividends. The boat should not be rocked. He fears that any change in pricing strategy may scuttle the vessel, so he prefers the status quo.

5. **THE MAVERICK.** He scorns the traditionalist. A pricing strategy more than



at decisions are important but secondary.

The Pricing Specialist

Who should he be?

Panelists at an American Management Association conference on competitive pricing agreed that the chief executive should have the final word on all major decisions. But except in the small company, the president hasn't time to do the necessary fact gathering and exploration. Who should be in charge of that?

The marketing or sales vice president is the candidate of Carl M. Smalheer, marketing specialist for the Cleveland management consulting firm of Robert Heller & Associates. Such a man is certainly in the logical position to be the president's top pricing adviser. But he must be of the right temperament.

Alfred R. Oxenfeldt, professor of marketing at Columbia University, says: "A good pricer must be patient with routine, willing to analyze masses of data, prepared to make estimates and judgments (rather than take refuge in mechanical techniques), and be willing to reason through (step by step) the consequences of particular actions. He must be willing and able to sift through hundreds of salesmen's field reports, reports of the market research department on the results of price experiments, and detailed periodic reports of the sales analysis section. A good pricer should also be familiar with basic principles and concepts relating to price determination and be able to apply them to concrete cases."

Is your pricer such a paragon? "In my experience," says Professor Oxenfeldt, "the pricing function usually has been discharged by people who are 'men of action,' untrained or poorly disposed toward the study of detailed information."

The best spot for the chief pricer is in marketing, but he can be in accounting, engineering, production—almost anywhere. "His authority must be clearcut," says Peter F. Annable of Heller & Associates.

The chief pricer's main problem is lack of co-operation. Much of the information he needs to price

three years old automatically should be changed. He thrives on pricing turmoil and is at his peak when none of his customers can understand his price sheets.

6. **THE PSYCHOLOGIST.** He goes down the daisy chain of thought processes by calculating: "If we do this, then this will happen, and next this will probably occur, and, if so, then this will be the final point." He reads books on motivation research and is inclined to let tricky suppositions dominate facts.

7. **THE QUICK CHANGE ARTIST.** He spends little time in analysis and study. He dashes off a new price sheet; puts it in the mail; then waits for the reaction. At the first murmur, he backs down and issues a revised quotation. His prices sway with each market breeze. Often he furnishes a 4-in. binder so customers can file price-change bulletins.

8. **THE NOVELIST.** He makes no pretense of working out a valid price structure, but simply issues a fictitious price, then haggles with prospective buyers over the amount of discount from the published price.

9. **THE COLLUSIONIST.** Illegal as he is, he's still around. When faced with a pricing decision, his first instinct is to talk it over with competition. He wouldn't dream of making a bold move but prefers a watered down approach that is usually more satisfactory to competitors than himself.

10. **THE STATES RIGHTER.** This strategist can't bring himself to adopt anything that smacks of a national policy. He wants a flexible approach that gives each individual trading area its own price, terms, and adjustments. Sometimes that's feasible, but it's tough to administer, harder to explain to customers, and, sometimes, the U. S. government.

for profit is collected by persons not directly charged with the pricing responsibility. Salesmen, the accounting department, and market research may sit on vital information. The chief pricer is often forced to seek out what he needs. That's why he should have authority and a top title—perhaps vice president or general manager for marketing.

Mr. Annable notes one danger of putting him in marketing or sales: He's more vulnerable than elsewhere to the pressures that trigger price fighting (more about that later).

Another problem the pricer faces is a lack of money—it's usually needed to find out what your charges should be. Example: By changing the price on only one item in a line of fasteners, an executive increased net profits $10,000 a month. "I had to guess at some facts because it would have cost about $1500 to assemble the required information. I couldn't get the appropriation. I suspect I was conservative in my guesses. Maybe data would have shown us how to boost net profits by $20,000. I can't prove my point, of course. No figures."

Pricing and Costs

"There is no simple pricing formula that can be applied to all products or all companies," says Dr. Jules Backman, professor of economics at New York University.

The fashion is to say that costs determine prices. But if you believe that is the all-inclusive explanation, Dr. Backman says you should ask yourself these questions:

- How are costs determined?
- What is included in costs?
- Are past, present, or future costs included?
- How is the break-even point determined?
- What period is covered?
- What is done if your competitor has a higher or lower price?
- Why do profits fluctuate as much as they do?
- Why do so many companies report losses?
- Are cost records in a form useful for pricing?

"The fact that costs can be determined in a variety of ways often results in the method of cost determination that yields the price that is justifiable on other grounds," Dr. Backman claims. "Costs are only one of several factors which determine industrial prices. A business must cover its costs over a period of time. Doesn't that mean that costs determine prices? Not necessarily. It often means that the price determines the level of costs that can be incurred."

But Dr. Backman would agree with this: Whether your product is standard or engineered, an everyday item or a new or unique offering, you first must know your costs—"if only to know how much you're losing," says one rueful marketer. (Then a myriad of competitive and strategical considerations will determine how much, if any, you will recover over costs.)

As Dr. Backman suggests, cost finding is often less than scientific. "There's too much general accounting and not enough cost accounting in industry," says Mr. Smalheer.

A maker of scientific instruments entered the consumer market with a light meter for amateur photographers. It proved to be overpriced, but the company insisted that costs had been pared to the bone and quotation couldn't be lowered. A double check revealed that costs were much lower than accountants believed. It was possible to make the price competitive and still yield a good profit.

The error turned up in the accounting methods. Production costs for the fairly simple light meter

The 'Marginal Income' Approach

C. P. HAWKINS

Formulas can't make pricing decisions for you, but they can help you arrive at conclusions. C. P. Hawkins, vice president for Trundle Consultants Inc., Cleveland, has developed what he calls the marginal income approach.

It builds into the price a percentage for fixed absorption. It considers all the variables and none of the fixed. The profit is provided by a percentage included in the formula. When you vary the marginal income by product line and products within the line, you can appraise the effect on the total marginal income.

Here's one way value can be attached to various elements (all figures are percentages of the selling price the manufacturer expects to receive):

Direct Material	**40.0**
Direct Labor	**12.5**
Variable Manufacturing Expense (equals direct labor)	**12.5**
Variable Sales Expense	**2.0**
Variable Administrative Expense	**0.5**
Commissions	**5.0**
Returns and Allowances	**1.5**
Freight	**1.0**
	75.0

That leaves a marginal income of 25 per cent, to absorb fixed expenses and provide profit. That figure is average for stamping plants, foundries, light steel fabricators, machine shops. A machine tool maker probably has a marginal income of 25 to 30 per cent. A steel company would need 40 per cent. If the marginal income is over 25 per cent, other proportions in the formula will have to be reduced accordingly.

Let's see how the formula works for a foundry that has an order for gear castings. Mr. Molder of the shop's

were averaged in with those for complex scientific instruments. The average was unrealistic. It put the cost of the meter too high, the cost of the instruments too low.

Another common accounting mistake is to ignore certain costs. In new products, introductory expenses are often overlooked or underestimated. Real depreciation, as distinct from tax depreciation, is commonly underestimated.

In some pricing situations, the decision must be based on data much deeper than mere cost determination based on accounting. For a new product, a market research study is in order. The report should answer questions like these:

- What is the range of prices at which the product will sell?
- What volume can be sold at what prices?
- What will be the cost of marketing the item?
- What will be the total cost of developing, engineering, producing, and introducing it?
- Does the product need periodic model changes?
- If so, what will be the estimated costs of retooling?
- What profit is needed, in relation to other lines of the company?

After market research, the product should be turned over to engineering for design recommendations and probably the prototype. Next it should go to production to develop manufacturing processes and costs.

Since all products were once new, a market research study, ideally, is at the bottom of all pricing decisions. Realistically, that's not the case. If you're having troubles with pricing your present products, and

in Pricing for Profit

pricing staff takes a look at the known quantities in the formula. From his bill of materials, he knows they cost $10 per casting. Labor standards data indicate that direct labor costs $3.125. Variable manufacturing expense will cost the same. The knowns of the formula will add up to this:

Direct Material	**$10.000**
Direct Labor	**3.125**
Variable Manufacturing Expense	**3.125**
Total	**$16.25**

That leaves:

Variable Sales Expense	**2.0%**
Variable Administrative Expense	**0.5**
Commissions	**5.0**
Returns and Allowances	**1.5**
Freight	**1.0**
Marginal Income	**25.0**
Total	**35.0%**

If the unknowns will amount to 35 per cent of the total price, then the knowns will account for 65 per cent. And we know that 65 per cent represents $16.25. So it takes only elementary algebra to figure the price the foundry should get for each casting. Let X equal the sales price and:

$$0.65\ X = \$16.25$$

$$X = \frac{\$16.25}{0.65}$$

$$X = \$25$$

Mr. Molder should charge $25 for each casting.

if you have never made a thorough market research study of them, such a move would be wise—including a recap by the engineering and production departments.

In any event, a periodic price review of all products is a must. Recheck your thinking, whenever your cost basis changes, whenever new models come out, and whenever you have a marked change in volume. Shifts in volume on the down side can be especially dangerous. Many companies, such as General Motors, figure their prices on volume at 80 per cent of capacity. When levels go sharply below (or even above) the target, refigure your charges. You may not be able to do anything about your quotations (or may not want to), but you should know the new circumstances. Even if you think you have had no cost changes, a check at least once a year should be the rule.

Once you know your costs, what is your ideal price? (We're considering the price you, the manufacturer, realize, not the final figure the buyer pays after the product has gone through an echelon or two of distributors and dealers.)

In much of metalworking, the goal is a 20 per cent return before taxes on total gross assets. Aluminum Co. of America figures a 20 per cent return on investment will mean a 10 per cent return after taxes. The return should also be figured on the basis of sales. Traditionally, profit has been computed as a return on sales. But the trend is also to figure it on assets. Reason: In the long run, you must make your money on your total investment. Sales gyrate, and profits based on sales returns tend to gyrate with them. The asset figure is more stable.

Dozens of formulas can be used to calculate your margins over costs. One applicable to much of metalworking was developed by C. P. Hawkins, vice president of Trundle Consultants Inc., Cleveland (see the accompanying exhibit). He cautions that his formula is merely a tool, no final answer to your pricing decision.

Pricing and Strategy

The final decision rests on the chief pricer's informed judgment. He must decide how much (if any) over costs he should go for the best long term marketing strategy.

A maker of a hobby tool, for example, sold more at $199 than at the original price of $185. A maker of castings consistently kept his prices 10 per cent above those of competitors and still made money. A producer of a unique surface measuring device sold his product at double his costs, while a maker of a new kind of fastener priced his item 10 per cent above costs.

Those decisions reflect pricing strategy; all were right; all took into account circumstances affecting the product; all departed from standard pricing because special conditions prevailed.

The hobby tool maker capitalized on the psychological impression of $199—it sounds like a bargain: The last dollar squeezed out of expenses to get below $200. The previous price ($185) has no special appeal.

The producer of castings sold on quality and service, not price. He was content with the limited but stable market that his higher quotations brought him.

The surface measuring instrument

Pricing: Six Planks in a Sound Platform

Paul B. Wishart, president of Minneapolis-Honeywell Regulator Co., Minneapolis, presents this philosophy of pricing:

1. Strengthen the selling, merchandising, and service functions of the company rather than turn in panic to price cutting to meet a tough situation.

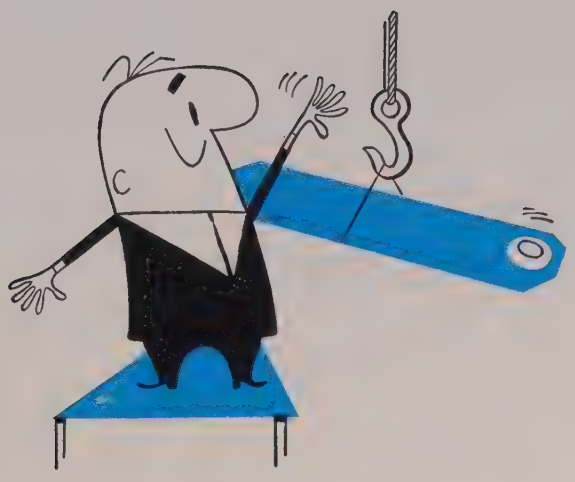
2. Drop the product rather than compromise the company's long term pricing and profit objectives.

3. Bring prices into line with costs within a reasonable time to sustain the over-all pricing policy—especially in the case of new or improved products.

4. Watch those high profit margins; they invite competition more rapidly than lower ones.

5. Be aboveboard about your pricing information.

6. Keep your pricing policy simple by making it easily understandable to customers and salesmen alike.



represented a technological breakthrough. Although it sold at double the manufacturer's costs, it did a better and quicker job than competing methods and sold for about the same price. The maker was skimming the market until competitors caught up with him and pushed down the price. (Remember ball-point pens? They sold for several dollars just after the war. Now you can buy one for a dime.)

Although the fastener was new, it was not unique. Others of different design did the same job. Here, the pricer was trying a job of mass introduction through an attractive price.

Those decisions required judgment, after the formula work.

Joel Dean, a pricing specialist, likes to cite the case of fictitious Johnson Forklift Co. It developed a special model to handle asbestos pipe, the first in its field. It cost $2500 to make. Johnson priced its standard products 40 per cent above costs, but 60 per cent was picked as a fair markup for the new item. The price ($4000) was soon found to be far out of line. The first prospect said that he was studying a proposal for a $12,000 conveyor belt installation that would be exactly equivalent to four of the fork trucks. So he wouldn't even consider the trucks unless they were priced below $3000 each. In fact, he wouldn't buy them at the lower price, which made them cheaper than the conveyor belt. At $3000, he figured his savings would amount to a return of 20 per cent. His company insisted on a 30 per cent return on all investments in cost-saving equipment. It meant he could pay no more than $2000 each for the fork trucks.

What was wrong with Johnson's approach? Joel Dean says the first fallacy was in thinking that the device was new. It was not—because a competitor had designed an alternate way of doing the same job for less. Secondly, Johnson erred in its market research. The company should have known that the prospect demanded a 30 per cent return. It should have changed its pricing strategy to conform with those facts.

Many other aspects of pricing strategy should be examined. Consultants at Robert Heller question the hoary philosophy of loss leaders and full lines for industrial companies. Says Mr. Smalheer: "Not all items in the line need to produce the same profit ratio, but none should be a consistent loser." He thinks losers should be dropped. "You'll never miss them, and you'll discover that you, not your customer, have been the one that always thought a 'full line' was sacred."

Pricing simplicity is another strategic weapon. Complex discounts scare the buyer away. Such arrangements are usually made on the ground of "flexibility." They can also put the seller in a strait jacket by discouraging business.

Footnote on Strategy

Still another area requires greater caution—price escalation. It's a legitimate thing to do if you make power generating equipment, hydraulic turbines, or similar products that may not be delivered for two or three years. In these inflationary times, it's a safeguarding hedge.

But if you do practice it, look out. Tie your prices to a pertinent index. The big problem is that smaller companies, particularly, tend to hook on to something that's too far removed from their situation. They may not run into trouble during a general upswing when all indexes are climbing, but they can get into a jam in a recession when many price indicators are falling.

Examples: A supplier of steel mill equipment was tied into the metals and manufactures index of the Bureau of Labor Statistics on materials and the average hourly manufacturing earnings on wage rates. Both took a big dip, but his costs continued to climb. The fallacy: The metals and manufactures index includes scrap and copper. Both nose-dived to pull the index down. In the wage index, the average hours worked dropped sharply to pull that index down.

A maker of a product containing brass was also tied to the metals and manufactures index. His costs went up; the index down. Fallacy: Brass is a small factor in the weighting of the index.

Moral: If you must escalate, know your index.

Price Fighting

Price cutting is often justified as a strategic move. It has been unusually fierce in the last six to nine months. In the Cleveland area, machine work is going for $3 an hour or less, vs. $5 or more a year ago.

Nationally, it's common to have 10 to 12 bidders on engineered equipment jobs, with at least one cutting price corners. Gray area types of price concessions are also growing in number and in ingenuity (see accompanying exhibit).

Even though you can rationalize such maneuvers, here's a strong word of warning:

"To put all our competitive eggs into the price basket," says Fred C. Foy, president, Koppers Co. Inc., Pittsburgh, "is shortsighted at best and suicidal at worst. We have much more than price to sell—design and application features, availability, quality, use convenience, modern packaging."

Mr. Foy believes those are real values and competitive factors. "Most of them are as important or more important than price in creating demand. Compare the frozen foods and other ready convenience items of the modern supermarket with the bulk foods of the cracker-barrel store. That comparison shows that to millions of consumers the new elements of use value have proved more attractive than price."

The most serious shortcoming of price-only competition is that it inevitably brings a slowdown or stoppage of growth. Listen to Leonard H. Krieger, president of the Institute of Scrap Iron & Steel (his industry is plagued by wide price swings):

"Wouldn't our industry be better off to handle a full complement of material it's geared to handle—stocking more material on falling markets to sustain better price levels and creating reservoirs to meet the next pressure of rising operations? I believe we would handle more tonnage at a better average profit and that the range between the low and high price in any move would be narrower."

At a plastic houseware convention, a molder said this to producers supplying him with materials:

"When you were selling polyethylene at the stable price of 41 cents a pound, my company made more money than it does now when the price is much lower but bounces with every deal. Why? Because I didn't have to spend all my time rushing around to see if I could make as good a deal as the next guy—and never being quite sure. I'm too busy trying to be a price detective to get any constructive work done. I want the lowest price reasonably possible, but if it has to be at the expense of my peace of mind and creative part of my work, then I'll take the stable price even though it is higher."

Says Mr. Foy: "The lack of a clearcut pricing policy is going to make it that much tougher to fight the cost-price squeeze. If we stick to a consistent price policy, I feel it will give more assurance and stability to our planning for the future. We will have more time and energy to give to the really creative part of industry. We can plan for physical expansion, for new product development, for more efficient production, for more useful

Pricing: Six Ways To Go Broke

Many approaches to pricing will lead to bankruptcy, but here are the easiest:

1. Give nobody clear responsibility for gathering pricing information and setting prices.

2. Have no pricing objectives except the wish to stay solvent. Never write out your philosophy.

3. Be inconsistent in your pricing strategy—price to skim the market one month, to penetrate it the next.

4. Set prices solely on what your competitors do; ignore costs.

5. Figure price on cost alone; ignore demand.

6. Cut prices at once when demand falls off.

Seven Ways To Price Fight Through the Back Door

FRED FOY

Price fights often occur today without a single base price being cut, officially or unofficially. The price fighter may even be half fooling himself. Of the many ways to do it, seven stand out. Fred Foy, Koppers Co. Inc. president, who compiled the list below, points out that, used within reason, all are legitimate business practices. But sometimes they're abused.

1. Credit. It has provided newlyweds their first bed. And that's legitimate. Yet, how easy does easy credit have to be before it becomes nothing more than a price concession? Mr. Foy's answer: "Credit becomes a price concession to the extent that the seller absorbs costs to finance the buyer's purchase or inventories beyond what is established as a norm for that trading field. Or if he grants it to one customer and not to another."

2. Advertising allowances, especially the automatic kind that amount to a fixed percentage of the sales involved. Do you insist on proof that the allowance was spent for advertising as intended?

3. Carload buying so the customer can qualify for the lowest price. That's O.K. as long as you don't allow split shipments to qualify as carload deliveries.

4. Off-grade material. Is it really of second quality, or is this a price cut?

5. Selling through resale outfits at lower prices. News of this always leaks out eventually, so it amounts to price cutting.

6. "Export" sales. Lower prices are sometimes necessary to sell abroad, but when the "exporter" sells in the U. S. at export prices, that's price cutting.

7. The long term contract. Is it really long term and does the seller actually realize savings that can be passed on? If not, this is just fancy price cutting.

products, and for better earning performance."

Summary

The "who" should always come before the "how" in pricemaking. Because a pricing decision can't be reached solely on the basis of a formula, the man who does the job must have informed judgment. While the president should pass on pricing policy and review all decisions, the man who does the preliminary spadework and analysis, particularly in middle-sized and large firms, should be at the vice president or manager level, preferably in marketing or sales.

While costs must always be recovered over the long run for a company to survive, many other considerations must also figure in the pricing strategy—competition, laws, the special problems of introducing a new product, and a host of other matters. But indiscriminate price cutting is bad strategy. In short, we need creative pricing for long term profit.

"Creative pricing," believes Mr. Foy, "can do more toward strengthening and stimulating our economy than any government planning can hope to achieve. We can help erase the feast or famine that often prevails in price-only competition. We can do our share toward leveling out the peaks and valleys of industrial activity, so that business and industry can plan for steady progress."

"Sweet little money-maker...before we put the wheels on!"

Funny joke! But the boss is not amused.

His company supplies the body of that cart to other manufacturers – successfully, too. Just recently he decided to market a model of his own, complete with wheels. Yes . . . they're selling fast. But the company's losing money on every shipment.

What happened? With late and inadequate cost reports on that wheel assembly, the price was set too low. Weeks passed before the boss found out. And it'll be weeks more before his profits stop taking a licking.

How different with Keysort punched-card controls! With Keysort's meaningful *on time* job-cost summaries, management would have known how costs were running at every stage . . . could have acted *fast* to keep them in line. Thus, price could have been set to *cover* costs . . . and the new product marketed with a healthy profit included.

Keysort punched cards – speeded by the new Keysort Data Punch which simultaneously imprints and code-punches production or sales information – today offer the most practical, most flexible means of obtaining the fast, accurate, comprehensive reports you need for complete control of your business and profits. Without disrupting your present accounting methods. At remarkably low cost.

The nearby Royal McBee man has a presentation which will show you how it's done. Phone him, or write us.

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Technical Outlook

ONE-SHOT FINISHING—The Du Pont laboratory at Wilmington, Del., reports early successes with cleaning, phosphatizing, and painting steel parts in a degreaser. Greasy parts enter one end and come out the other end dry enough to touch. Asphalt and alkyd base paints work best—some are boiled for two years with no apparent change in quality. Side benefit: There is no paint buildup on hooks since the degreaser washes them off each time around.

TESTED ON THE GROUND—A mobile testing laboratory gave the Douglas DC-8 (jet airliner) its first shakedown flight in a hangar. A trailer, designed by Ling Electronics Inc., Culver City, Calif., contained all the vibration test equipment needed to determine structural vibrational modes of dynamic structural characteristics.

FUNDAMENTAL MAGNETIC RESEARCH—A zirconium-zinc compound ($ZrZn_2$) shows evidence of ferromagnetism at −389° F even though it does not contain any of the commonly known ferromagnetic elements. Scientists at Bell Telephone Laboratories, New York, consider it a powerful tool for studying magnetic materials.

HI-TEMP PROPERTIES SOAR—One of the new vacuum-melt alloys for jets and missiles, Allegheny Ludlum's D-979, works well at temperatures up to 1600° F. A precipitation hardening alloy in the 200,000-psi range, it has a 100-hour stress rupture strength at 1500° F of 35,000 psi, vs. 13,000 for A-286. Composition (percentage): 4 tungsten, 4 molybdenum, 45 nickel, 15 chrome, 3 titanium, 1 aluminum, 0.05 carbon, and small quantities of manganese and boron (balance iron). Cost: About $4.50 a pound.

TITANIUM PROCESSING IMPROVED—New uses for two chemical compounds, Turco 4367 and Ti-Form, have been discovered by North American Aviation, Los Angeles. Turco 4367 inhibits the formation of scale during heat treatment of stainless steel, nickel-chrome, and alloys of cobalt, titanium, and copper; Ti-Form prevents gaseous contamination of pure and alloy titanium during heating.

HIGH SPEED INSPECTOR—An electronic device developed by RCA's Industrial Electronics Div. checks more than 3000 auto engine valves an hour. Operating to within 5 millionths of an inch, the machine measures concentricity, length, head thickness, stem, and the diameter and location of grooves. Valves pass into segregation chutes which can handle 11 classifications.

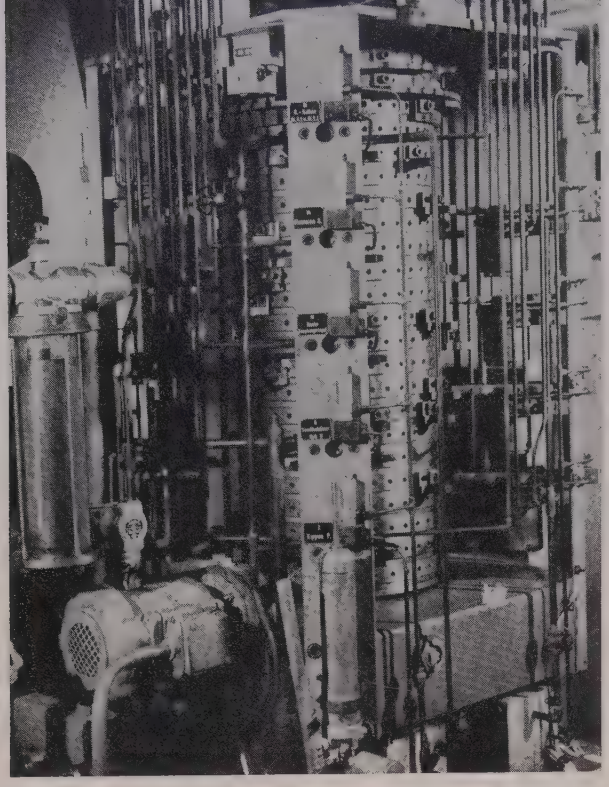
ROTARY KILN TREND—Allis Chalmers Co., Milwaukee, says that the grate-kiln system will soon be used for agglomerating and heat treating many metallic and nonmetallic minerals and concentrates. Shipments of kilns are increasing.

ANOTHER MAGNESIUM ALLOY—A new magnesium casting alloy for missile and aircraft applications has excellent damping capacity. Dow Chemical Co. says it will be used where exceptional vibration resistance is needed. Called K1X1, it contains 0.4 to 1.0 per cent zirconium.

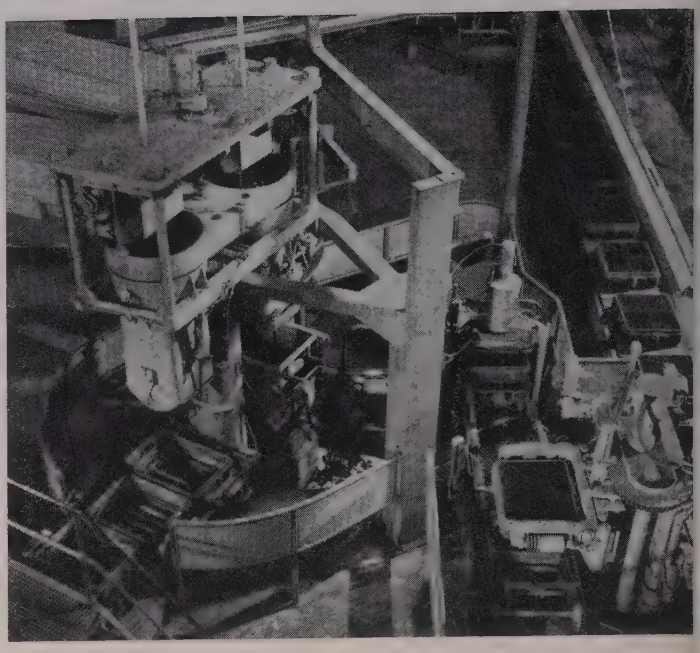
A LASTING RED FINISH—You will soon be able to buy a red automobile that will not fade. E. I. du Pont de Nemours & Co., Wilmington, Del., has developed a red pigment which is lightfast. Commercial quantities are expected to be available by this fall.

CERAMICS PROGRESS NOTE—Scientists can fuse new ceramic coatings with advanced metal alloys and come up with a combination that resists 5000° F. Nathaniel Cannistraro, vice president, Bettinger Corp., Waltham, Mass., suggests "earthier" applications than missiles and rockets. As coatings for coal chutes, for example, the material can stretch a six-week service period to several years. Coatings will also cut corrosion losses.

Metalworking Outlook—Page 41 Market Outlook—Page 131



Standard air valves operated by drum mounted cams control all program cycling in the automatic foundry. An electrical system indicates any malfunctioning unit



Molding of cope and drag molds is automatic. View of automatic molding unit for drag shows flask entrance station at left and mold discharge station at right

Automated Foundry System

Designed for a production jobbing shop, it allows variation in output rate, casting size, shape, and weight. Prototype installation produces 300 molds an hour

INSTALLATION of an automatic foundry system that can turn out 36,600 tons of castings a year (two-shift operation, excluding downtime) opens the door to a new era in the production of small and medium parts.

Operating at the malleable iron foundry of George Fischer Ltd., Schaffhausen, Switzerland, the system represents a departure from the conventional approach to foundry automation:

1. Equipment design is based on latest technological developments, not as a solution to material handling problems.

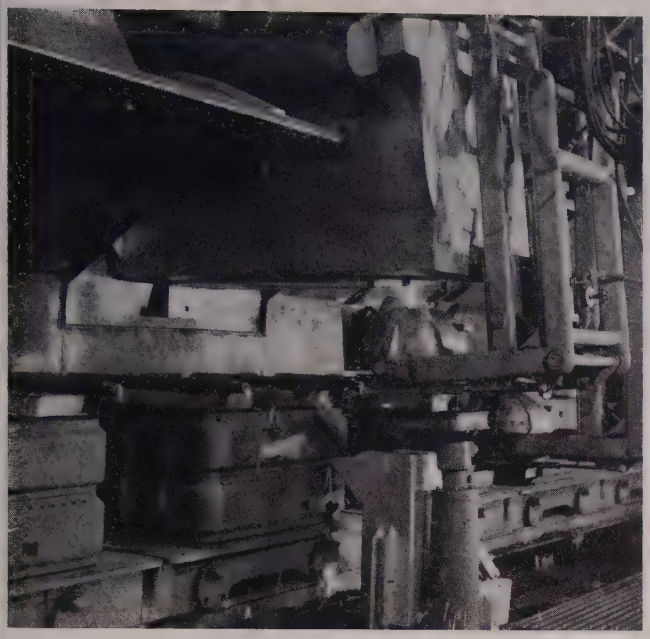
2. The system is designed for flexibility in production per pattern and variations in casting size, shape, and weight. It differs from systems designed primarily as single-purpose lines producing such things as motor blocks, heads, manifolds, and tube fittings.

Known as the Buhrer automated molding and pouring method, the system was developed by Erwin Buhrer, Swiss consulting engineer, the engineering staffs of American Automation Corp., Ann Arbor, Mich., and George Fischer Ltd.

Automated operations include molding of drag and cope molds; closing of molds; weighing down of molds; pouring; mold cooling; shakeout; bottom plate, cope and drag flask separation and return; sand feed and return, including cooling.

Production Is Flexible—Maximum production depends on the average casting weight per mold. With a two-shift operation, and no allowance for downtime, a nine-man crew (excluding core setters) can annually produce 36,600 tons of castings with an average weight of 60 lb per mold, or 12,200 tons with an average weight of 20 lb per mold. Based on 4080 hours of operation a year, 1 manhour is required to produce a ton of castings at 60 lb per mold; 3 manhours per ton at 20 lb per mold.

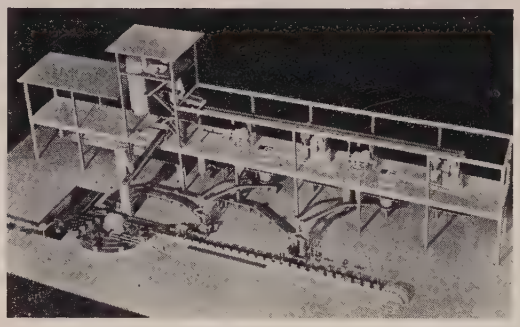
The rate of production can be varied in small increments from 300 molds an hour to about 150 molds an hour. Design of the automatic molding units permits the change of a pattern plate in about 1 minute. It is also possible to use a different flask height for each of the three molding stations. Flask size is 22 x 27 in., and height varies from 6 to 12 in.



Pouring is controlled and automatic. The pouring ladle on the weighing platform receives controlled amount of metal from stopper ladle above

Cooling conveyors permit various cooling times for different size castings. Molds in foreground are pushed onto main conveyor. They accumulate on individual cooling sections

Is Flexible



Model of three-station twin installation foundry system with sand handling plant

Mechanical-pneumatic devices control all program cycling in the automatic setup. There are no electronic controls. An electrical system indicates the location of a malfunctioning element.

Highlights of System — Clay-bonded sand (synthetic) is used as the molding medium. Molds are precompacted by jolting, then jolted and squeezed for final compaction.

The process results in uniformly hard molds.

A new type mold gripping and stripping device is used to prevent the flask from tilting during stripping. The device made it necessary to build a new type molding flask.

The diversity of the production program led to the design of a subdivided pattern plate. The special clamping frame allows for a quick change of pattern plates, and also for the use of various types of plates, such as metal and plaster, at the same time.

The transfer of molds to the conveyor, as well as the closing of molds, requires precise and tight gripping of the mold by the holding devices and complete co-ordination of the various movements.

In the automated pouring operation, a controlled amount of metal (enough to fill the mold without waste) is poured from a stopper ladle into a pouring ladle. That method of pouring made it necessary to form a system of channels through which the pouring basin is connected with the sprues of the sectional pattern plates. Shockfree automatic loading and unloading of the molds with sectional pouring weights are carried out by two link chains on either side of the conveyor.

Shaking out of the flask is done on a special jolting device which prevents damage to the flask.

The car-type conveyor is not arranged in the conventional continuous horizontal loop. The return track is below the advancing track so that cars can be transferred from one track to the other.

The sand conditioning system eliminates excessive dust in cooling the return sand. Additions of new sand and other ingredients are made automatically. The circulating sand volume is constant.

American Automation says dimensional accuracy and surface finish are better than those of ordinary sand castings. Consistency of quality is enhanced by the elimination of the human element. Improved quality results in lower cleaning costs and scrap rates.

Interchangeability of major components and a program of preventive maintenance assure that downtime is kept at a minimum.

The Job: Produce high strength automotive steering knuckles

Saved: 14 cents a part

OLD METHOD	NEW METHOD
C 5150 steel forgings	C 1046 steel forgings
	Harden & quench
Harden & quench	Temper to 228-269 Brinell
Temper to 255-321 Brinell	Rough machine
	Induction harden fillet
Rough machine	Temper to 42-47 Rockwell C
Grind	Grind

Two Steps

Aggressive cost trimming has helped this manufacturer soften the effects of unavoidable increases in other areas. Here are two examples and their results

INDUCTION HARDENING of critical areas of automotive steering knuckles to boost fatigue life has permitted the use of less expensive steel. It's saving the com-

The Job: Quench Transmission Gears

Saved: 24.5 cents a part

OLD METHOD	NEW METHOD
Load gears	Load Gears
Carburize	Carburize
Unload	Hot oil quench
Press quench	Wash and temper
Reload	Unload
Wash and temper	

Quenching Costs Cut

A second heat treat process improvement is saving 24.5 cents a part on gears for the PowerFlite transmission. In addition, equipment changes allow a 10 per cent increase in loading capacity, and 20 per cent less floor space is needed to do the job.

The change: A switch from press quenching to hot oil quenching at the Indianapolis transmission plant.

Old Method—Gears came from the machine shop and were loaded, two or three at a time, on fixtures; then they were placed on trays which were pushed into furnaces. The trays were withdrawn manually, and parts placed in a quench press. After quenching, gears were reloaded on trays and sent through a wash and tempering process. After inspection, the parts went to final machining and assembly.

The process required individual handling of each gear at each step.

Cost Conscious — Again, Chrys-

to Heat Treat Savings

pany 14 cents a part.

Problem: When proving ground tests showed fatigue stresses exceeded knuckle design requirements, management at Chrysler Corp., Detroit, called in the central engineering and master mechanics staffs to seek a solution.

Old Method — The parts were formerly made of C 5150 steel. Rough forgings were hardened and oil quenched and tempered to a hardness of 255 to 321 Brinell before being machined and ground to finish dimensions.

Studies showed greatest stress was in the fillet areas between the shaft diameter and the flange. It seemed logical to increase the physical properties of those areas to produce greater fatigue strength. Engineers started studying alternate heat treating processes and materials.

Solution—Carbon steel was picked. Engineers decided to induction harden the areas of greatest stress. Savings that came from using less expensive steel paid for the additional heat treating equipment; unit costs were lowered; and quality was higher.

New Method—The forgings are made from C 1046 steel, hardened, quenched and tempered to 228 to 269 Brinell. After rough machining, the fillet areas are induction hardened to a depth of 0.1 in. and tempered to 42 to 47 Rockwell C. Grinding to final dimensions completes the job.

Equipment — The new method necessitated the purchase of five induction hardeners and three vertical tempering units which are automated.

The equipment paid for itself the first year of operation at Chrysler's Newcastle, Ind., plant.

ler's staff went to work, experimenting with different forms of hot oil quenching. It finally adopted a system which was put into operation at the Kokomo, Ind., transmission plant.

Says Robert E. Morken, staff consultant for Chrysler's heat treating and equipment section of the plant engineering department: "When management saw how well the system worked at Kokomo, it was decided to put it in at Indianapolis."

Conversion—The company moved a three-row furnace from Kokomo and converted it for hot oil quenching at Indianapolis. Two other cold oil quench furnaces were converted, and two were left unchanged for the handling of other parts.

New Method — Parts now come from the machine shop, are hand loaded on a more versatile fixture and charged into the furnace. They automatically cycle through carburizing, hot oil quenching, washing and tempering. Trays automatically return to the front of the furnace where one operator can unload and reload. Finished parts go on to final machining and assembly.

The project was completed last year. The payoff period is expected to be a little over two years.

More Savings—Heat treat specialists also figure they have picked up a 25 per cent increase in fixture life. Improvements in quality have cut rejects 18 per cent.

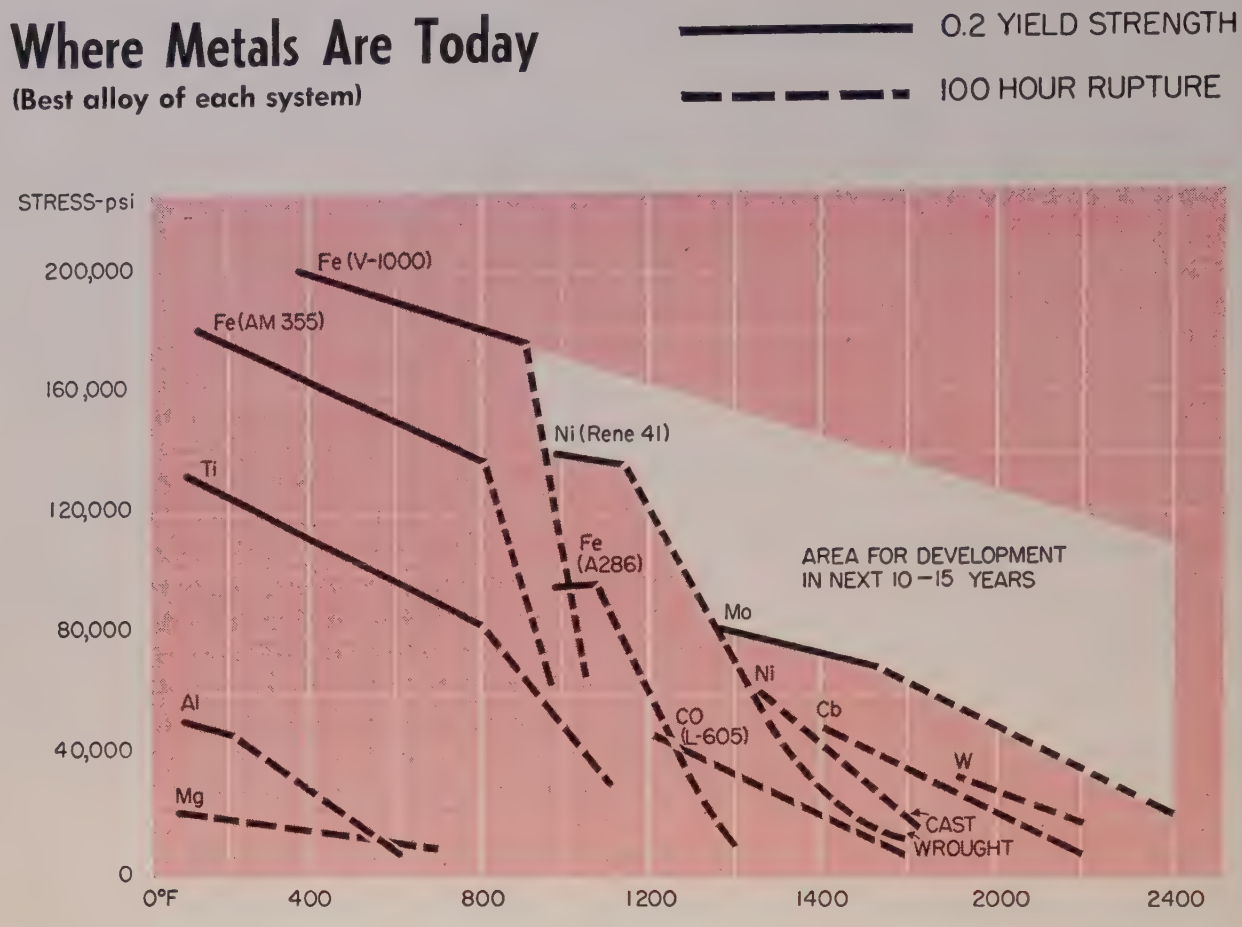
COST CRISIS COMPETITION

This article is part of a campaign to help industry achieve lower unit production costs. The accompanying story, and others to follow, are examples of what the editors of STEEL have received from industry as entries in the Cost Crisis Competition.

Watch for selected entries to be published in STEEL, beginning with the July 7 issue.

Where Metals Are Today

(Best alloy of each system)



Source: R. G. Frank, Aircraft Gas Turbine Div., General Electric Co.

Needed: Facts on Space Age

Paralleling the need for new materials is the need to know more about the ones we have. ASM symposium points out some of the places where we need more information

METALLURGISTS are intrigued with the challenge of space, even with earthbound problems unsolved.

Mused one at a recent ASM meeting on aircraft materials in Cleveland: "Ten years ago when we worried about heat we were thinking about planes sitting in the desert sun. Now we're building tunnels to test materials in environments of 15,000° F!"

Help Wanted—Plainly enough, we have entered the space age. With it have come new methods of propulsion, new fuels and propellents, new environments. They add up to a crying need for new materials and new knowledge.

Designers who know they'll never get one universal material with the melting point, strength, ductility, and corrosion resistance to answer all their needs still look for miracles. Sometimes, one of the new alloys turns out to be a partial answer, but established materials aren't being overlooked or discounted. (Witness the rebirth of the hot work die steels.)

Reminder—Listen to Edward J. Dofter, assistant head of laboratories, Missile Div., Chrysler Corp.: "Many of the materials we already have have a lot more life in them than we imagine. The designer needs more information to make intelligent choices. Average data aren't good enough.

A Program for Space Age Research

Proposed for a quick payoff by Col. Rodney A. Jones, USAF, Directorate of Laboratories, Wright Air Development Center, Wright-Patterson Air Force Base, Dayton, Ohio.

1. Evaluate the materials we now have under simulated space conditions.

Find out in the laboratory how they react to high vacuum, ozone, dissociated and ionized gases, acceleration, shock, temperature, vibration, nuclear radiation, and zero gravity.

2. Test materials and define space environments through space flight.

Because of extreme cost, this should be limited as much as possible to verification of laboratory results and theories.

3. Find out why the strength of materials varies so much between observation and theory.

We know that the theoretical strength of engineering materials is 10 to 100 times greater than strength values observed experimentally. The significance of a breakthrough in this area justifies substantial scientific effort.

4. Determine total properties of materials and how to make maximum use of them.

Mechanical, physical, chemical, nuclear, electronic, electrical, and other properties, and how they interact, must be more fully understood if materials are to be used to their full potential.

5. Develop composite materials to make the most of good properties and minimize deficiencies.

Honeycombs, laminates, cermets, and coated materials are significant examples of this approach.

Metals

"Designers beef about stress-rupture data. We don't design things to rupture—we design them not to rupture. Designers want old fashioned stress-strain curves and more data on modulus of elasticity. Such information is not available in sufficient detail.

"Who cared what the emissivity of a polished stainless sheet was a few years ago? This is the sort of information that is becoming increasingly important."

Missiles—We need both the short term and the long term picture. A guided missile differs from a high speed aircraft in only one important aspect—length of life—Mr. Dofter points out. This means that missile materials should be nonstrategic and noncritical because there's no scrap recovery.

The short life of missiles allows us to upgrade many materials. For instance, the stress-rupture picture of a typical material such as 302 stainless is quite different at 10 seconds and 100 hours.

Skin Temperature—This problem of missiles has received a lot of publicity, but some others are just as tricky and perhaps more critical. Take fuels: The ammonialike ones such as hydrazine are corrosive to copper-base alloys. The alcohol base fuels, when denatured, are corrosive to magnesium base alloys.

Among the oxidizers, liquid oxygen with its boiling point near − 300° F presents great thermal expansion difficulties. It is also highly reactive, so all contact with organic materials—seals, lubricants, plastics —must be avoided to prevent explosions.

Solid Fuels—They're much simpler, requiring no pumps or piping, but they have their limitations. High speed flight experts see a future for both solid and liquid fuels, singly and in combination. One such combination: Stable suspensions of metal particles in a hydrocarbon base fluid.

According to Henry C. Barnett, assistant chief, Propulsion Chemistry Div., NACA, Cleveland, the ones to watch are hydrogen, beryllium, boron, and perhaps magnesium. The first three are the only elements having heats of combustion higher than petroleum fuels. Hydrogen is gaseous, beryllium scarce, leaving boron with its 23,000 Btu per lb, the material of greatest immediate interest.

Metal Fuels—Already, reasonably stable slurries containing 60 per cent metal powder (by weight) can be made. They can be pumped and sprayed, which means they can be handled in an engine.

Boron hydrides are another class of materials much talked about for fuels because their heats of combustion are so high. But they have some nasty disadvantages: They're toxic, break down in the presence of heat or moisture, and form oxides on burning which foul up the engine.

Research continues on methods to tap the thermodynamic promise of these materials. Under study now is a liquid fuel made up of boron, carbon, and hydrogen. Mr. Barnett sees boron as the premium fuel for long range flights, magnesium for short ranges.

Engines—In comparison with the material and mechanical worries encountered in skins, nose cones, fuel handling, and guidance systems, engines seem to be bothering designers and metallurgists far less. They say frankly that (at least by comparison) 3000 to 5000° F engine heat does not present insoluble or really tricky engineering problems.

Regenerative cooling is proving effective, and engineers are learning how to use high melting point materials, heat reflectors like thin gold foil and gold plating, and sandwich construction to beat the heat.

How Hot?—You have to be careful to qualify high temperature talk. For instance, 1000° F is high for

bearings, 1200° F for steam turbines, 2000° F for jet engines, and 5000° F for missiles. And a lot depends on what is done with the heat.

The 5000° F temperature generated at a missile nose surface on its re-entry into the atmosphere can be lived with in several ways. Approaches that have been tried include:

1. Heat sink—A high conductivity nose absorbs the heat as it is generated, sufficient mass being present to carry the missile from atmosphere to ground before the nose reaches the melting point.

2. High melting point—Sheer refractoriness is used to keep the nose from melting in the critical time period.

3. Low conductivity—A material is employed which may melt on the surface, but conducts heat so slowly that it takes a long time to melt all the way through.

4. Sacrifice—A load-carrying nose is covered, sandwich fashion, by an insulating material and a thin, high melting point skin. If the skin burns away, the structural nose remains.

Many Choices—Each of these has other applications to high speed flight. Certain materials are ruled out by scarcity or too low melting point for structural use (although they may have great importance in plating, cladding, or small area uses). We are making good use of aluminum, cobalt, iron, magnesium, molybdenum, nickel, and titanium. Beryllium, chromium, columbium, tantalum, tungsten, vanadium, and zirconium are still relatively unexploited.

R. G. Frank of applied research operations, Aircraft Gas Turbine Div., GE, Cincinnati, has put together a chart that gives a quick summary of where we are today with metals for high temperature use. (See graph on Page 102.) It make his point that the superalloys are the first choice where they'll suffice.

Refractory Metals—"The one reason we have turned to the refractory metals (molybdenum, tantalum, columbium, vanadium, tungsten, chromium) is for strength at high temperatures," he says. "Tungsten is the only present possibility for 5000° F. Most research groups have given up trying to make an oxidation-resistant molybdenum alloy. Columbium gives much better promise. However, development of a closed cycle turbine could make it possible to use molybdenum in an inert (or nonoxidizing) atmosphere."

Mr. Frank raises the same point made by Mr. Dofter: We need more facts. "Design curves," he says, "should be obtained on the same thickness of material as planned for use. Oxidation of the surface lowers the strength of thin sheets more than thick sheets."

Steels—Most progress in aircraft steels has been made in improving strength, the least in improving density, M. E. Carruthers, supervising research metallurgist, Armco Steel Corp., Middletown, Ohio, told the conference. He named these high temperature steels as holding the center of interest:

Special SAE: 17-22 A.

Hot work: Vaso Jet 2000, Thermold J.

Martensitic stainless: 12 MoV.

Precipitation hardening: 17-4 PH, 17-7 PH, PH 15-7 Mo, AM 355.

Austenitic precipitation hardening stainless: A 286.

Titanium — This metal, which was highly touted for its favorable strength-density ratio a few seasons back, is having tough sledding. Better steels have been shaving away its advantages in strength and corrosion resistance; stronger aluminum and magnesium alloys are undercutting it on the lightness side.

A good deal of resistance to titanium is engendered by its embrittling tendencies. Designers are holding off until they see what the newest wonder metal, beryllium, will do.

Titanium people have been working constantly on hydrogen embrittlement, and they have put through price cuts which amount to 75 per cent in seven years.

Lightest — "Magnesium has as good a chance as any metal for getting along with Buck Rogers," declares John Kirkpatrick, vice president of Brooks & Perkins Inc., Detroit. Lightness is the greatest thing magnesium has to offer, but when thorium is added to it, its high temperature performance is improved.

Says Mr. Kirkpatrick: "In the past year, lithium-magnesium alloys have proved to be excellent ballistic missile armor plate, and lithium-magnesium alloys still in the laboratory give some promise of being heat treatable. The Falcon contains 92 lb of magnesium alloys (90 per cent of the missile)."

Aluminum — This material also continues to make great strides. Edgar H. Dix Jr., assistant director of Alcoa Research Laboratories, New Kensington, Pa., says that plates 124 in. wide x 43 ft long and roll tapered are regularly rolled for wing sections.

Among alloys being used extensively for aircraft and missiles are 2024-T86 and 2014-T6. Experimental alloys X 2219-T6 (6 per cent Cu, 0.03 per cent Mn) and X 2020-T6, an aluminum-copper-lithium alloy, show promise. Another one, X A 140-T, looks especially good for use in extrusions at temperatures up to 400° F, and 2020 is probably good to 350° F for long periods of time, says Mr. Dix.

Powder metallurgy continues to be the hope for many high temperature products. Two of the newer aluminum powder materials are M 257, containing about 5 per cent oxide, for making extrusion billets, and M 486, containing a larger percentage of oxide and some iron.

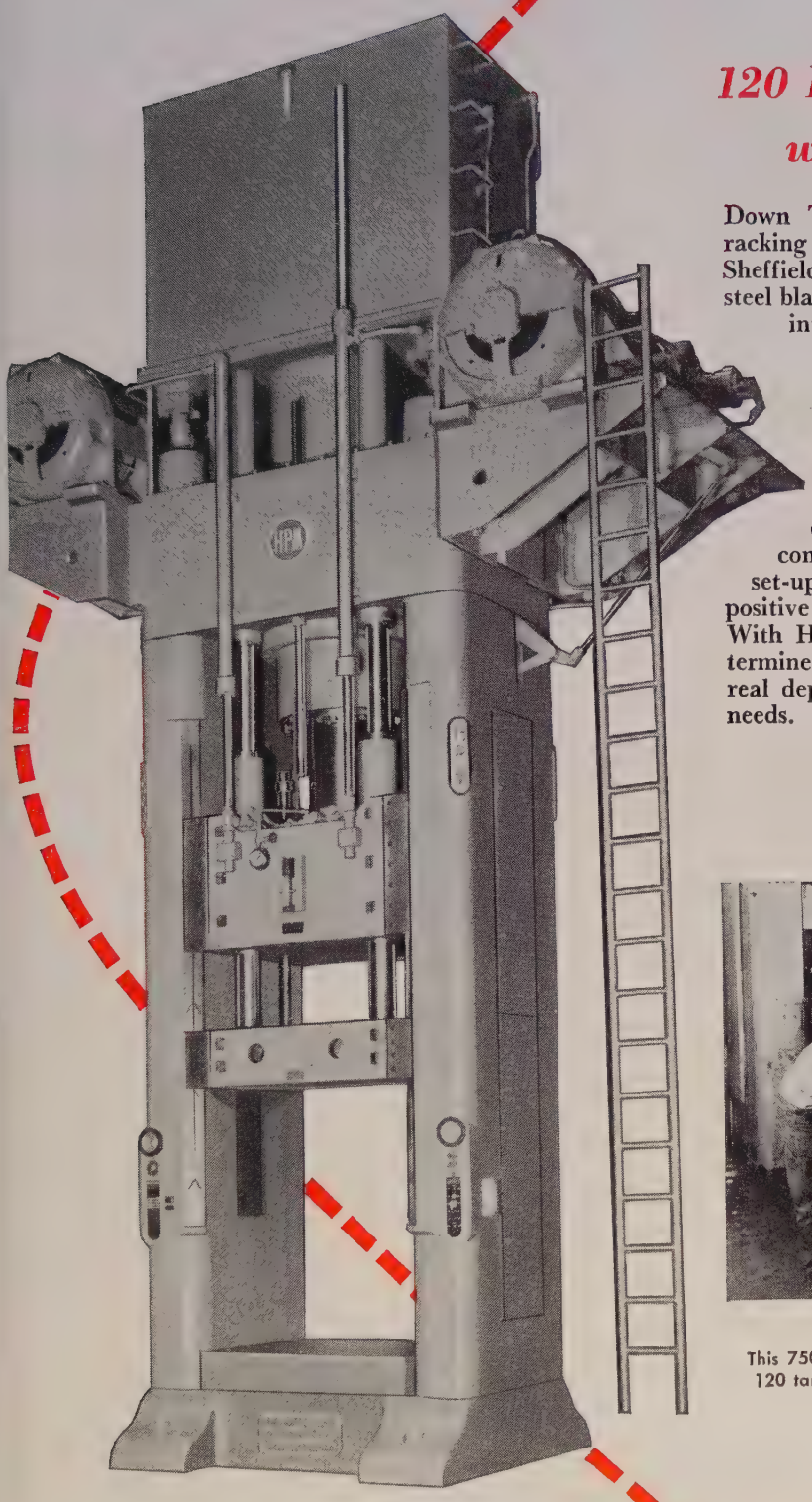
Beryllium—The biggest powder news is due to be made by beryllium. Commercial beryllium sheets, 20 x 40 in. and in gages to 0.060 in. will be available in 1959, says Buford Sparks of Brush Beryllium Co., Cleveland. Sheets made of this supposedly brittle material show 10 to 20 per cent elongation, 115,000 psi tensile, and 100,000 psi yield. Its modulus of elasticity is around 34 million. The sheet is rolled from powder pressings.

The potential size of beryllium powder compacts can be judged by a recent one which would have weighed 5 tons if it were cast in steel. As with the other materials, much more design data are needed.

Possible applications for beryllium, which depend on its good heat sink properties (five times better than copper), are in nose cones, leading edges, electronic gear and brake parts. Its high modulus of elasticity will make it suitable for control surfaces and instruments.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

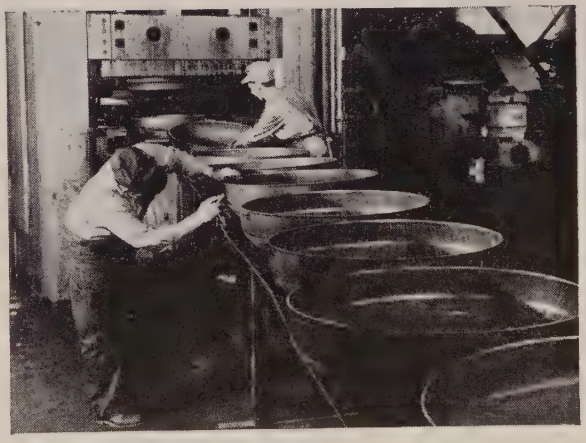
BIG THINGS WITH H-P-M PRESSES



120 Big Draws Every Hour with 750-Ton H-P-M

Down Texas way, this big 750-ton H-P-M is racking up impressive production figures for Sheffield Steel Corporation of Houston. The .210" steel blanks, 39" in diameter, are fed automatically into the press and drawn to a depth of 10". The finished tank heads are 30" in diameter; later welded to tank cylinders for gas storage use.

Here's why H-P-Ms really pay off for Sheffield . . . smooth fast drawing action without impact . . . fastraverse closed-circuit system for constant and controllable drawing speed . . . quicker die set-up . . . positive overload protection . . . positive blankholder pressure for entire draw. With H-P-Ms you have press reversal at predetermined pressure or position. Specify H-P-M for real dependability—for all of your metalworking needs. Write today for complete information.



This 750-Ton H-P-M with automatic feeding device turns out 120 tank heads an hour for the Sheffield Steel Corporation.

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H835

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HPM

The frozen hearth contents after core drilling. Coke extends well down into the metal zone, and slag is full of it

Technologists at U. S. Steel's Research Center examine one of the cores drilled from the frozen hearth

Furnace Is 'Quickfrozen'

Operation of an experimental blast furnace is stopped at mid-cycle. Among the findings: Engineers now know for the first time how raw materials are distributed

SUSPENDED ANIMATION, blast furnace variety, has been achieved by joint efforts of U. S. Steel Corp., Linde Air Products Co., and the U. S. Bureau of Mines.

Engineers from the three stopped a blast furnace operation in mid-cycle by injecting a prolonged blast of nitrogen. They now know for the first time exactly how raw materials are distributed in the furnace and exactly where the transition between solid and fused states takes place.

End of a Furnace—Opportunity for the experiment came when the Bureau of Mines decided to move its 34 ft tall, experimental blast furnace from the Oakland area of Pittsburgh to Bruceton, Pa. Since the furnace had to be dismantled, the time was ripe for a quickfreeze.

It took 3 million cu ft of nitrogen introduced through the tuyeres over a two-week period to complete the freeze. Water was played over the furnace shell to aid cooling.

When the furnace was cool, the loose material was removed as 3000 6-in. cube samples. The 5200-lb solid mass of coke, metal, and slag remaining in the hearth is being sampled by core drilling.

No More Guesswork—The location of various zones and the chemical changes which occur in the furnace have long been inferred from indirect evidence. Now operators can see how right their guesses have been.

Two surprises already have turned up: 1. Unaltered coke penetrated deep into the slag-metal layer in the hearth. 2. Raw materials loaded into the furnace in layers maintained their stratified relationships and changed little in appearance until they reached the melting zone.

Answers Are Sought—U. S. Steel scientists hope to trace the full ore reduction process through the furnace. They also want to determine the mechanism of sulfur transfer and chart the path of sulfur exchange between iron, coke, and slag.

Operators are becoming less wary of applying data from one furnace to another. There's a good possibility that what is learned about the ironmaking process on the experimental furnace will have direct application to their production stacks.

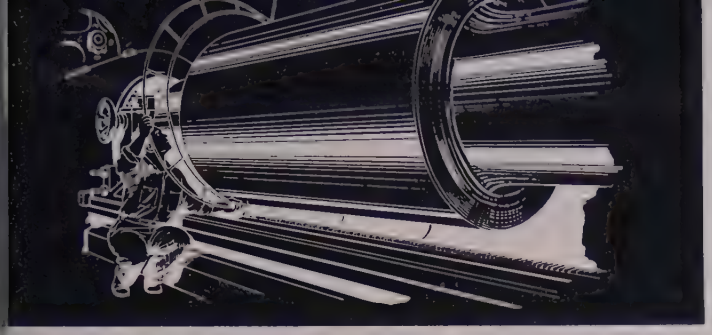
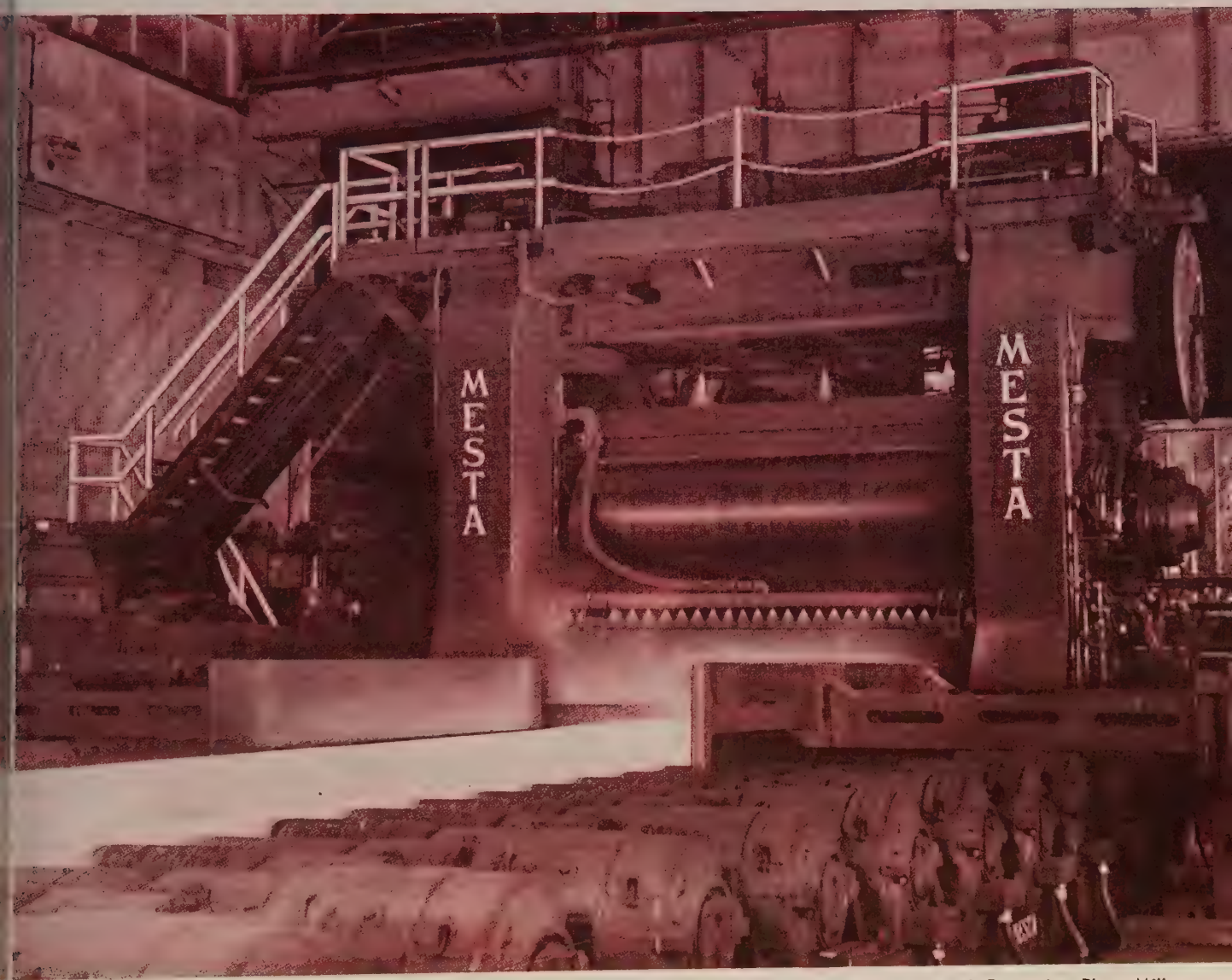


PLATE MILLS *designed and built by* MESTA



160" Four-High Reversing Plate Mill

MESTA *Machine Company*
Pittsburgh, Penna.

Stock stacked at left by hoist or lift truck is fed into transfer line. Operations: Load, rough bore, face, turn, inspect, and unload. Machine is being built by Kearney & Trecker, Milwaukee

Transfer Machine Shapes Car Wheels

Handling of 750-lb parts is greatly reduced by combining several pieces of equipment into one line. Its outstanding feature: Work goes through all stations vertically

RAILROAD car wheels will be automatically machined and handled vertically late this year, says Kearney & Trecker Corp., Milwaukee. It is building an automatic transfer machine for the Standard Steel Works, a division of Baldwin-Lima-Hamilton Corp., Burnham, Pa.

Eight machining operations are done at six stations. Production rate: One every 90 seconds.

Introduces Idea — Wheels are traditionally machined on separate tools (STEEL, May 19, p. 138). Kearney & Trecker's idea is to roll them from one station to the next—a cut in material handling.

Each of the stations is a separate machine tool. Since they are interlocked, all operate as a single unit. Here is the production sequence: Loading, rough boring, facing, turning, inspection, and unloading.

Controls operate the line as a single machine and enable each machine and intermediate units to run individually.

The machine (it's 7 by 30 by 118 ft) will cost about $250,000. It will weigh 340,000 lb.

Answers Market Problem—The transfer line with equipment is expected to reduce unit production costs which now run in the neighborhood of $60 for a 750-lb wheel.

GE Has New Alloys

The vacuum-melted metals have high strength in the 1600 to 1800° F temperature range

USERS of high temperature, vacuum melted alloys have two more to choose from: General Electric Co.'s Metallurgical Products Dept., Detroit, has added J-1610 (Rene' 41) and J-1650 to its line of special metals.

J-1610 is a precipitation hardening, nickel base alloy with high strength in the 1600 to 1800° F range. It can be forged, formed, and welded, is highly resistant to corrosion and oxidation. It's available as sheets, plates, bars, flats, and billets.

In 100-hour stress rupture tests on bar stock, J-1610 shows 18,000 psi at 1700° F. Short time tensile tests reveal an ultimate strength of 58,000 psi at 1700° F and 160,000 psi at 1400° F. Ease of fabrication makes the alloy ideal for such uses as afterburner parts, turbine casings, nozzle diaphragm partitions, and combustion liners, says GE. It also can be forged for turbine wheels and buckets and torque rings. It should make a good high temperature bolting and fastening material.

J-1650 is a cobalt-base alloy. It has good ductility and high strength plus oxidation resistance at temperatures in the 1600 to 1900° F range. A good combination of rupture and tensile properties can be developed by heat treatment at a single solution temperature.

J-1650 can be formed, welded, and brazed without severe cracking, claims GE. It's now in use for turbine buckets and afterburner cones. It should be good for missiles.

J-1610 sells for about $7.20 a pound and J-1650 for about $8.40 a pound. The Metallurgical Products Dept. indicates that maximum delivery dates will be about four weeks on billets and 12 weeks on sheets.

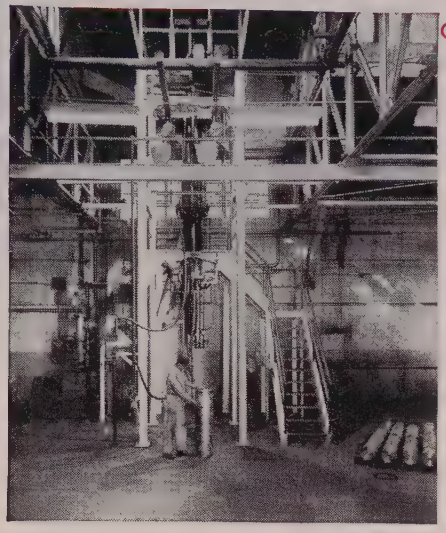
Readying Alloy Standards

The National Bureau of Standards is preparing standard samples (for spectrometric and chemical analyses) of 17 commercial high temperature alloys. Some of the materials: Type 316 stainless, 16-25-6 steel, 19-9DL, N-155, Inconel X, and Nimonic 80A.

Firth Sterling ...

PIONEER IN POWDER AND MOLTEN METALLURGY

AIR ARC



CONSUMABLE ELECTRODE (STERCON)

INDUCTION VACUUM (STERVAC)

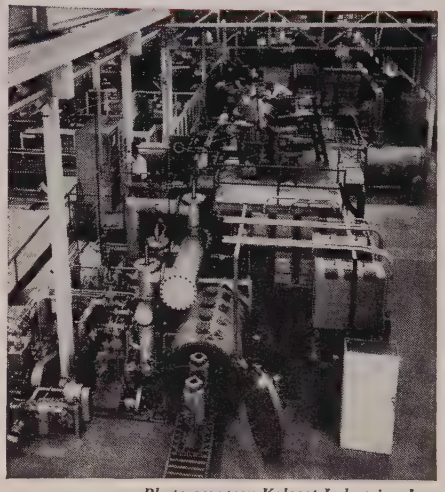


Photo courtesy Kolcast Industries, Inc.

Using Three Basic Melting Methods

to produce tougher high temperature alloys

Firth Sterling metallurgists have exceptional experience in *all three* basic melting methods—air arc, consumable electrode (STERCON) and induction vacuum (STERVAC)—used to produce high temperature alloys and super alloys to specification for the aircraft and missile industry. This unique combination of experience and facilities is available to you in developing high temperature materials with the purity, quality and mechanical properties essential to your applications.

For over 68 years, Firth Sterling has pioneered the development of tougher, more heat-resistant metals. The critical high temperature alloys produced for jet engine applications such as buckets, turbine wheels, shafts, compressor wheels, casings and blades, and structural rings and support members, are examples of Firth Sterling metallurgical achievements in meeting *today's* requirements. This valuable experience, capacity and technological "know how" are being applied to STERCON and STERVAC super alloys as well as basic metals such as Zirconium.

* *

For your high temperature alloy requirements involving quality and exceptional mechanical properties call on our practical metallurgical experience and modern melting facilities. Your Firth Sterling representative will give you complete information. Firth Sterling, Inc., Dept. 81F, 3113 Forbes St., Pittsburgh 30, Pa.

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FIRTH STERLING FS TRADE MARK

Private Show Is Big Hit

Distributor gets customers to look at more than 60 machine tools. Conversation piece: An induction hardener that works on gear teeth submerged in water

MACHINE TOOL users may not be buying much new equipment, but they haven't lost interest in it. Customers from all over the Midwest walked the aisles and talked shop in the booths at the Motch & Merryweather Machinery Co.'s private machine tool show at Cleveland. (STEEL, May 19, p. 151.)

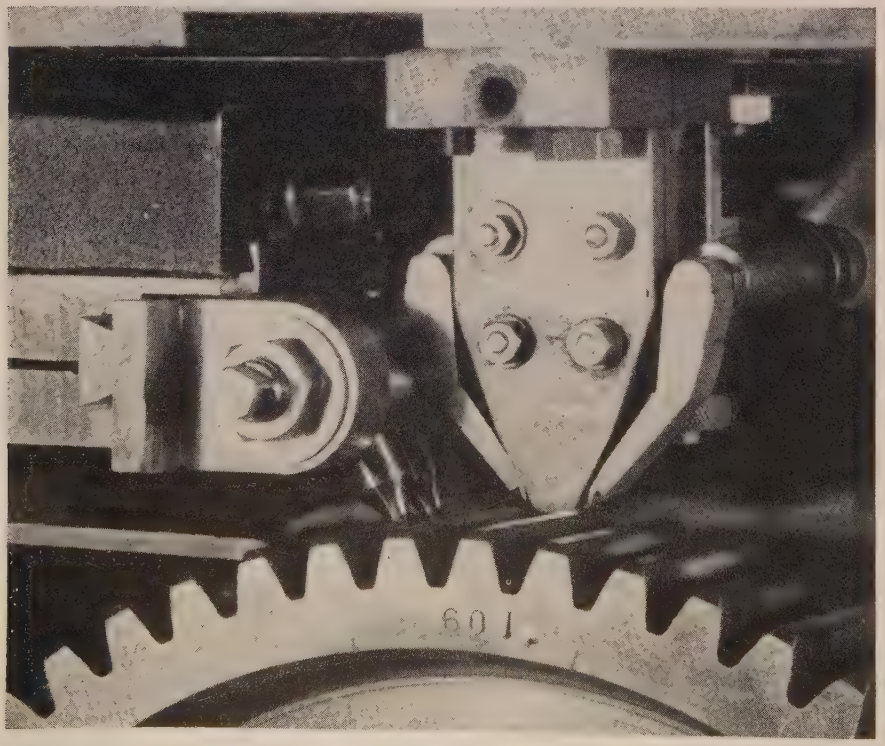
Most of the 33 exhibitors (19 machine tool, 14 accessory displays) had something new to talk about. Examples: Norton's 6x18 in. grinder with 125 fpm table travel, Cincinnati Bickford's 39-in., upright drill with large throat capacity; Gould & Eberhardt's high speed, gear hobbing machine; a Motch & Merryweather line of upright drilling and boring machines; Oster's automatic cycle turret lathe; and an Avey automatic cycle drilling and tapping machine.

Hardness Control — One of the conversation pieces—a gear tooth induction hardener that operates while the work is immersed in water. The unit is being built by Gould & Eberhardt Inc., Irvington, N. J., under license from Delapena & Son Ltd., London, England.

As the coil passes over the gear tooth, a steam pocket forms. The hardening is done in the pocket and as the coil passes, water immediately closes in to quench the hardened area. Since the whole gear is submerged, the hot area is closely confined, and gear distortion is minimal. Distortion is small enough to eliminate grinding after hardening.

Tolerances—Practical limitations on hardness depth run from 0.010 to about 0.040 in. By closely controlling the setup, case depth can be held to about 0.001 in.

The case is uniform on both sides of the tooth and through the root. The crest of the tooth, usually not critical, is the only unhardened area.



Coils pass across one gear tooth at a time, holding case depth to within 0.001 in. In operation, both the gear and the coils are submerged. The machine can handle parts 1½ to 26 in. in diameter

Fluxing Made Easier

A motorized fixture and simple brush arrangement speed operation on flange and cylinder

HERE'S an idea for speeding up the fluxing of parts with awkward contours before brazing.

Production engineers at Fenwal Inc., Ashland, Mass., devised the method to flux a stainless steel aircraft fire detector which has a triangular flange mounted on a cylindrical shell.

Fixture rotates part between brushes in the end of tubular handle

The hand brush method was slow and tedious. Dipping was impractical because the assembly is open at the end.

Done on Motorized Fixture — Fenwal solved the problem with a motorized fixture which holds the part and rotates it between a pair of flux brushes. The end of the shell is inserted in a collet mounted on the shaft of a fractional horsepower motor which rotates at low speed.

The fluxing brushes are held in the ends of a ¼-in. tube bent around to straddle the flange. The brush holder, which pivots freely on an axle, is slightly weighted at the front end, so that the brushes dip into the trough of flux when the operator releases the handle. The brushes swing out of the way when the fixture is being loaded and are always covered with flux. The fluxing rate is about 8 seconds per piece.

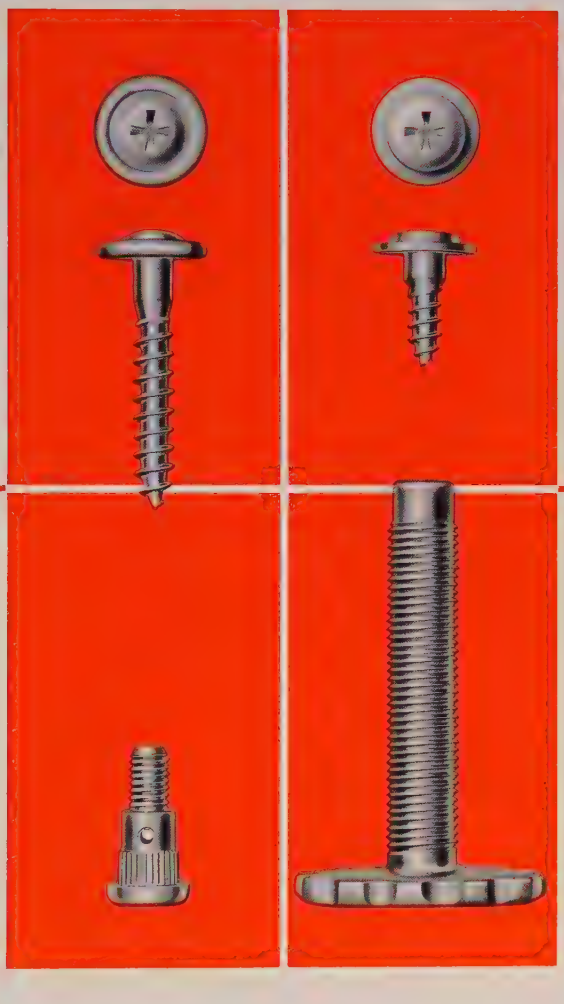
The flux serves as a protective coating to prevent oxidizing of the stainless steel during torch brazing with Easy-Flo 45 silver alloy, manufactured by Handy & Harman, New York.

KEYSTONE XL WIRE solved heading problems for

NATIONAL LOCK COMPANY

ROCKFORD, ILLINOIS

ONE Replaces TWO . . . by cold heading this Phillips washer head screw, National Lock replaced an oval head screw and finishing washer at a substantial cost savings. Regular wire caused cracked heads and required 100% inspection, so National Lock turned to Keystone "XL" Wire and eliminated cracking.



DESIGN PROBLEM SOLVED . . . this was an unsatisfactory 2-piece assembly, and a 1-piece Phillips washer head shoulder screw appeared to be needed. However, the design seemed too severe for cold heading. National Lock made this part a production item with Keystone "XL" Wire . . . and at a savings.

QUALITY AND QUANTITY . . . National Lock found it possible to have both when using Keystone "XL" Wire to economically produce this knurled shoulder screw. This part required a wire which could withstand a very severe extrusion and still fill out a sharp knurl to keep the part from turning in application.

INCREASE DIAMETER . . . National Lock reports this 1-piece cold headed leveling screw serves the same purpose as a 2-piece welded assembly, and the scalloped head fits 12-point socket wrenches. The use of Keystone "XL" Wire permits an increase in head diameter and a great reduction of cracked heads.

flowability IS THE SECRET

Illustrated above are four ways National Lock Company, Rockford, Illinois, has profitably put Keystone "XL" Wire and its *flowability* in action. Your Keystone representative will be glad to assist you in finding a solution to your heading problems. See him soon or write direct.

Keystone Steel & Wire Company, Peoria 7, Illinois

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COLD HEADING FACTS FOLDER . . . send coupon today! New folder discusses uses, applications, methods, technical facts, wire requirements.

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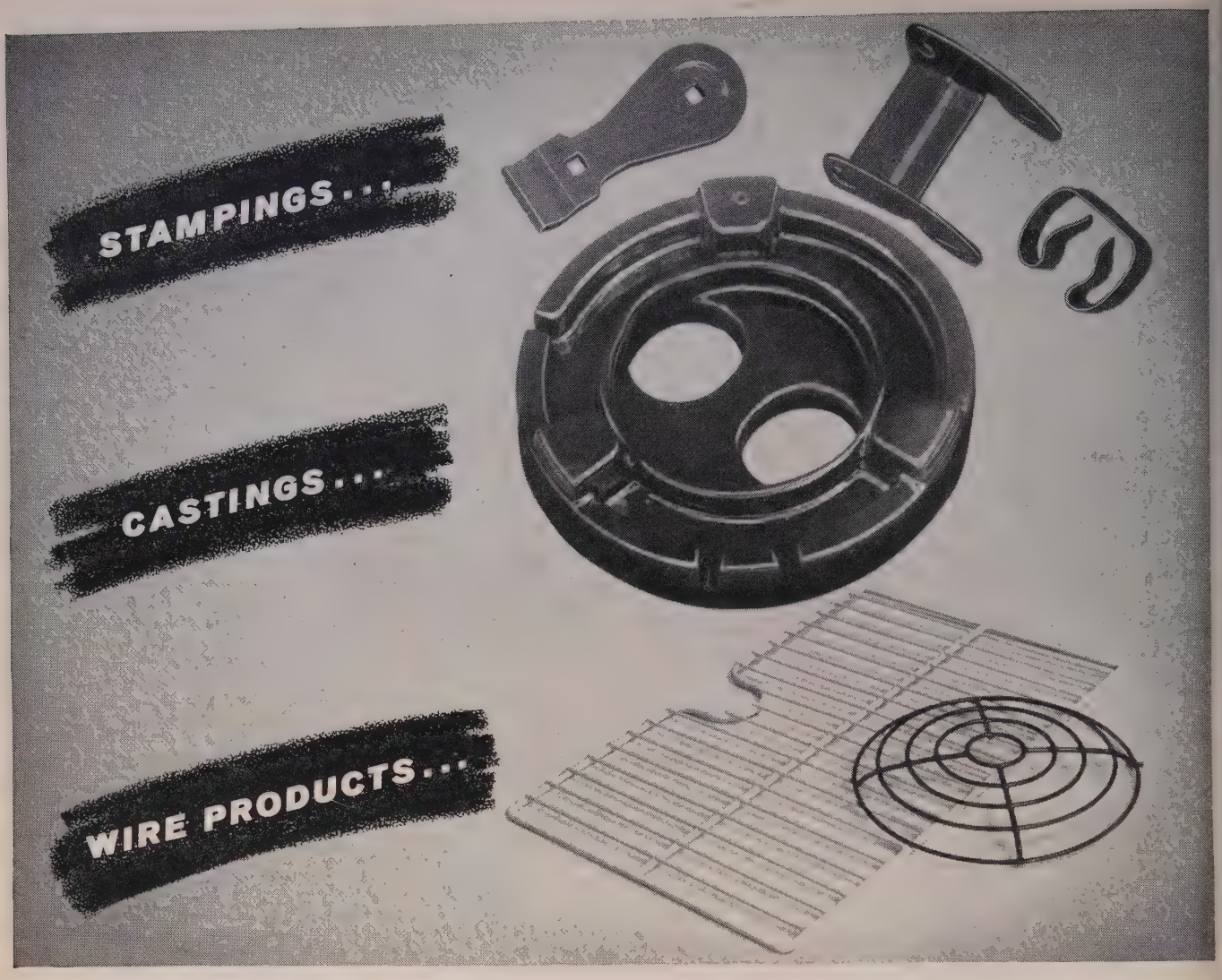

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CORVEL gives a premium appearance in beauty and controlled sheen—retains gloss and color. It assures uniform coverage even on sharp edges, corners, and projections. There's no worry about sag or drip marks, no bridging at intersections. And CORVEL finishes resist water, salt spray and sunlight—provide superior toughness, impact and abrasion resistance.

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CORVEL finishes are applied by the WHIRLCLAD® Finishing Process. The heated object is dipped into a fluidized bed of CORVEL powders. The powders, which are in a state of "whirling suspension", assume flow characteristics similar to a liquid and bond by fusion to the part.

CORVEL Fusion Bond Finishes are resin powders of various types specially formulated for use with the WHIRLCLAD Finishing Process. This new production process for cladding metals and other materials with plastics is licensed exclusively in the U. S. and Canada by Polymer Processes, Inc., an affiliate company.

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POLYPENCO®

Worker at left sprinkles powder adhesive on preheated metal part as man in background prepares to remove a mating part from the oven

Solvent-dispersed adhesive media used by Lansing Sound can be applied with a brush or spray gun at room temperature. It dries in air

Adhesives Improve Product Quality

Manufacturer of loudspeakers uses epoxy powder when metal joints require high strength. Thermoplastic cement does job where strength isn't essential to operation

BY assembling metal parts with plastic adhesives, a Los Angeles company has slashed manufacturing costs and improved the quality of its products.

The firm, James B. Lansing Sound Inc., makes loudspeakers for the high fidelity industry. It uses a high-strength epoxy resin product of Furane Plastics Inc., Los Angeles, to mate ferrous and nonferrous structural components; a less expensive thermoplastic cement is used where high joint strength is not essential to product quality.

The adhesives minimize defects which cause rejects and eliminate added machining which would be needed to improve the appearance of joints if other joining methods were used. Product quality is improved because joints of dissimilar metals have better resistance to sound vibrations—the main stress imposed on speakers when they're in operation.

Steps to Strong Joints—Parts to be assembled with the epoxy adhesive, which is obtained in powder form, are preheated to 500° F. Before they can cool appreciably, the adhesive powder is sprinkled over the mating surfaces. The heat liquefies the powder, causing it to penetrate the pores of the metal castings and create a smooth adhesive coating.

Parts are fixture assembled, returned to the oven, and heated at 500° F for 45 minutes to fuse the coatings on mating surfaces.

Where Strength Isn't Critical—The solvent-dispersed thermoplastic is used in the assembly of coils, cones, and diaphragms which do not require high joint strength. Their alignment is maintained by the speaker magnet.

The cement is applied and dried at room temperature. Mating parts are fixtured so they will be under pressure, and the adhesive coatings are fused at 400° F for 8 to 30 minutes.

Heat Must Be Constant—Lansing Sound has experienced only one difficulty: Temperatures in the heating ovens must be uniform during the curing cycle. It is necessary to hold within plus or minus 5° F to assure consistently good joints.

The problem was solved with two Despatch electric ovens (forced convection type) with controls to maintain precise temperatures. One oven has a maximum heat output of 650° F; it is used to cure joints with the epoxy adhesive. The other, which has a top output of 500° F, is used with the thermoplastic cements.

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- *Accurate and Uniform Gauge*
- *High Fatigue Life*

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SS-88

The partial list of Sandvik applications shown below is, in itself, good evidence of Sandvik steel's quality. In every case, Sandvik's performance is vitally important.

If *you* have an application where spring steel performance is important, check with SANDVIK. There's a good chance you'll find a SANDVIK steel that will suit your requirements exactly.

SANDVIK cold-rolled high carbon strip steel is available:

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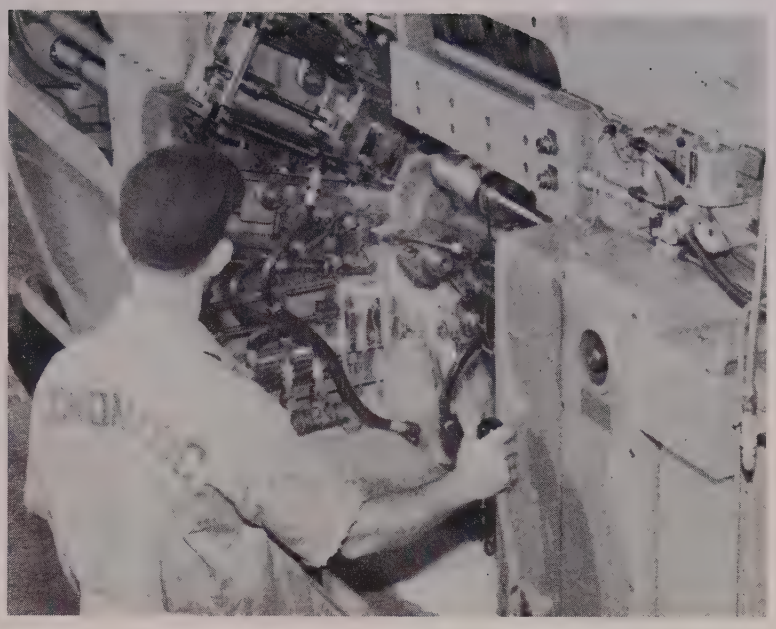
Sandvik Quality Steels



Sparkplug shells (at right) come off this six-spindle bar automatic at the rate of one every 4.41 seconds. The setup, in a corner of the Cone plant, is tailored for experimentation with machining variables: The goal: Minimum part cost

Quest for Optimum Machining

Watch for results of a new program to untangle the complexity of multiple spindle automatic jobs. Answers turned up may help you cut your costs and be a tougher competitor

IT ISN'T easy to tell for sure that any one setup on a multiple-spindle automatic machine is the best. Often a small change in tooling, or the stock, or any of the other variables can squeeze extra dollars from your costs.

To learn more about what constitutes so called optimum machining conditions, management at Cone Automatic Machine Co., Windsor, Vt., has initiated a Comapro (Co-Operative Machining Project) program, to learn more about the complex variables.

The Plan—Comapro is cosponsored by 16 other companies. Jobs considered most representative will be selected and a host of tool, cutting fluid, gage, and bar stock combinations will be tried.

As soon as the job has been worked down to its most efficient setup, the information will be made public, so all users can apply the principles to their jobs.

Variables — Cone management says the performance of any job depends on six factors: The bar stock, the tools and toolholders, measurement control, coolant and lubrication, the machine, and the personnel.

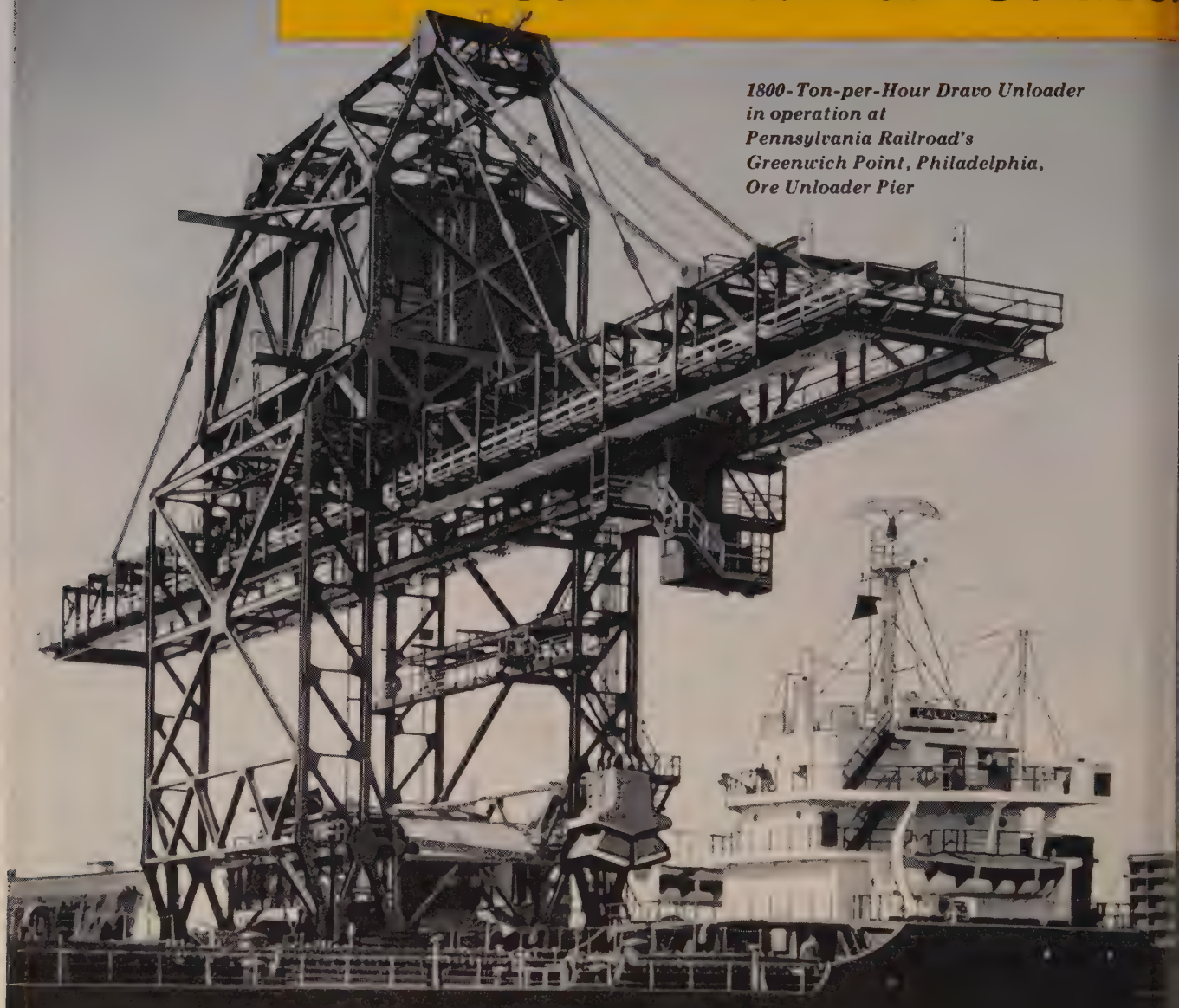
The cosponsors, each furnishing equipment or products and specialized knowhow to the program, are: Jones & Lamson Machine Co. (optical comparator, die heads, hollow mills); Federal Products Corp. (mechanical gages); Wilson Mechanical Instrument Div., American Chain & Cable Co. Inc. (Rockwell hardness tester); Brush Electronics Co. (surface indicator); Black Diamond Saw & Machine Works Inc. (drill grinder); Edward Blake Co. Inc. (tap grinders); Lincoln Engineering Co. (lubrication system); Royal Oak Tool & Machine Co. (form relief tool grinder); Abrasive Machine Tool Co. (surface grinder); Jones & Laughlin Steel Corp. and Joseph T. Ryerson & Son Inc. (bar stock); Firth Sterling Inc, (cutting tools); John Bath Co. Inc. (taps); Cleveland Twist Drill Co. (drills, counterbores, reamers); Scully-Jones & Co. (tool control system); and Gulf Oil Corp. (lubricants and coolants).

First Shot—The sponsors already have scrutinized their first job, a leaded steel sparkplug shell. It's the type of part that normally would be run in about 6 seconds.

Working with various combinations of tools and tool shapes, and trying combinations of the other basic factors, the team has trimmed cycle time to 4.41 seconds. A change in the shape of the cutoff tool boosted tool life from about 1000 pieces to over 3000.

Drills going into the 13/16-in. hex stock used to last for about 2000 parts before regrinding. A different point shape added more than 1000 extra parts per grind. Tool change time has been cut from 42 minutes 35 seconds to 5 minutes 40 seconds. Sponsors feel they will gradually close in on the optimum conditions for the job. The same approach will be put to work on many other parts.

EC&M Electrical Contro



1800-Ton-per-Hour Dravo Unloader in operation at Pennsylvania Railroad's Greenwich Point, Philadelphia, Ore Unloader Pier

Square D Field Engineering Service is available through more than one hundred Square D offices, backed by an international network of over 1000 authorized electrical distributors and 17 plants in the United States, Canada, Mexico and England

Executive Offices • 6060 Rivard Street, Detroit 11, Michigan

EC&M HEAVY INDUSTRY ELECTRICAL EQUIPMENT...NOW A PART OF THE SQUARE D LINE

THE ELECTRIC CONTROLLER & MFG. CO.

A DIVISION OF THE SQUARE D COMPANY

CLEVELAND 28 • OHIO

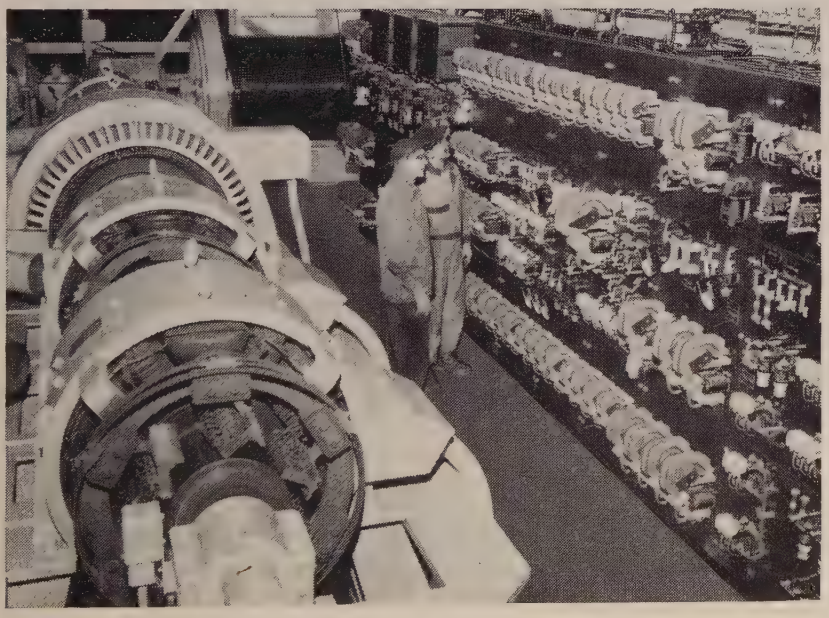
for Industry's Big, Tough Jobs!

22½ TON BITES!

Everything about this ore unloader is big... and it does a big job with amazing speed. Powered through 20 motors ranging in sizes up to 800 HP, it takes 22½ tons of ore from a ship's hold on an average cycle handling time of 45 seconds!

Electrical control equipment does a big job, too, in putting this unloader through its paces. And there's a lot of it. Hoist control, trolley control, bridge control brakes. *All of it is EC&M.*

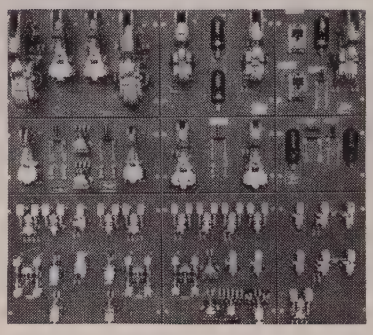
Consult EC&M when planning adjustable voltage installations



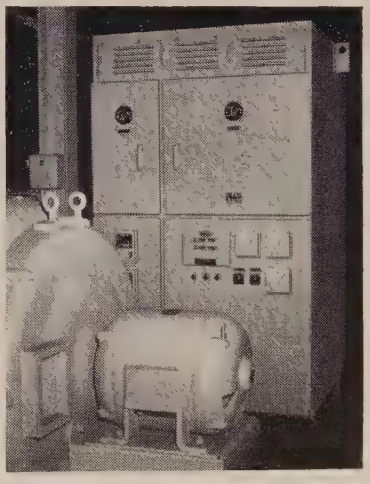
Here is an example of EC&M's control and engineering service in action. These EC&M control panels are mounted in the machinery room, 100 feet above ground level, along with generators which supply DC power for unloader motors. EC&M is geared to supply the complete job including rotating machinery for adjustable voltage and constant potential drives.

Photos courtesy Dravo Corporation, Elliott Company, and the Pennsylvania Railroad

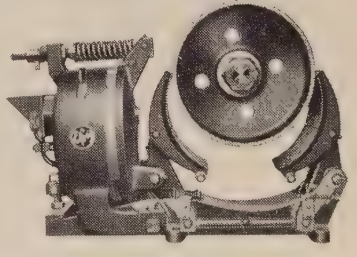
EC&M PERFORMANCE-PROVEN CRANE EQUIPMENT



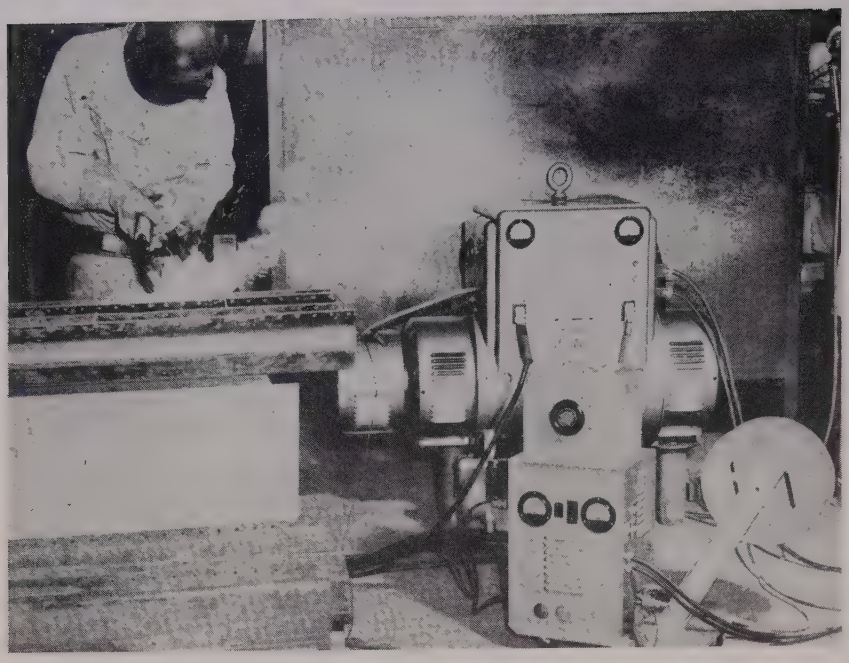
EC&M Adjustable Voltage Control Panel (mounted on trolley) for Hold and Close Line Motors and for Trolley Motor, plus Protective Panel for other drives

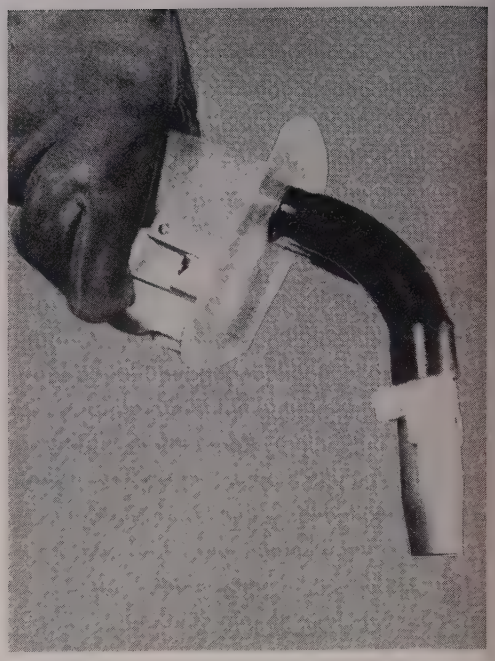


EC&M Type ZHA 4160 Volt Starter provides pushbutton starting of 800 HP Elliott synchronous motor driving 4 generators



EC&M Type WB Brakes—designed for fast response in releasing and setting. 100% lubrication insures exceptionally long life





Wire feed, controls, and wire reel on a wheeled platform make unit portable. Compactness and simplicity make mounting easy. Gun is at right. All leads are at back of handle for easy manipulation

Lightweight Gun Speeds CO_2 Welding

Auto frame manufacturer finds the device cuts costs. Air cooling eliminates water connection. Drive and control can be mounted in several positions

WHEN AUTO stylists dictate lower bodies, more hardtops, and no center pillars, framemakers note tremendous increases in welding costs for more box sections and stronger frames.

So says J. W. Holzman, assistant chief engineer, Parish Pressed Steel Div., Dana Corp., Reading, Pa., who finds that the CO_2 welding method has proved itself equal to meeting his firm's cost problem. He lists these advantages:

- Production welding speeds are up to 200 ipm in mild steel.
- Carbon dioxide shielding is cheap.
- Continuously fed wire eliminates electrode stub loss.

Joins Parade — The latest proponent of that type of welding is Hobart Bros. Co., Troy, Ohio, which has a new air-cooled gun which it terms "light, easy to use, and economical."

To add weight to those claims, Hobart points to Parish Pressed Steel which is using 24 of the new units for auto framemaking. That firm decided on the CO_2 method when it became impractical to cover further cost increases and added manpower requirements with conventional welding methods.

Mr. Holzman says that the Hobart gun solved most of Parish's problems. The drive is compact and can be mounted in many positions. Its four-roll drive has a positive pull to feed wire continuously from the 500-lb spools preferred for auto frame welding. Parts which wear or need servicing are easily removed and replaced. Ordinary tools can do the job. The gun doesn't need to be water cooled so there are no sealing problems.

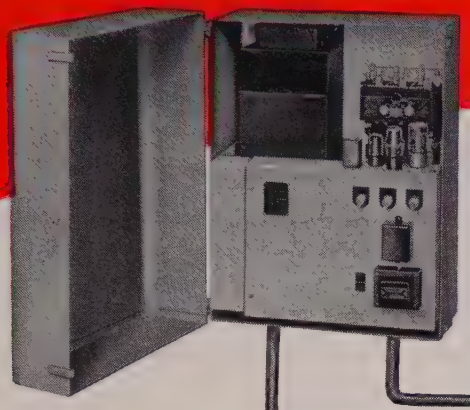
Gun Handles Easily—Cables to both gun and drive unit have twist-lock connectors. Wire feed, controls, and wire reel arm can also be mounted on a platform equipped with casters.

All connecting leads come off the back of the gun—a feature which reduces weight and improves handling. The twist-lock device helps an operator correct faulty wire feed without removing his gloves or using special tools.

Tested Other Methods—Parish Pressed Steel says it first experimented at length with semiautomatic submerged arc (Mig) welding. After trying argon, helium, and carbon dioxide, it concluded that much of the equipment wasn't strong enough for fast production, although welding speeds were increased radically. Its equipment selection satisfies both speed and durability requirements.

DYNAMATIC®

Drive Package Provides Infinitely Adjustable Speeds from AC Power Source



CONTROL PANEL

CONTROL STATION

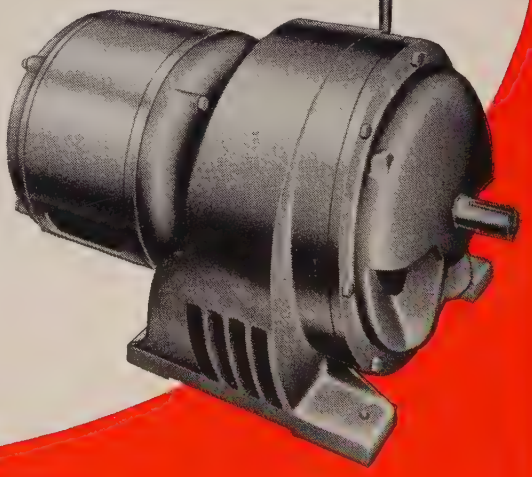
The complete Dynamatic power package includes all components required to provide infinitely adjustable speeds from an alternating current power source. A Dynamatic Ajusto-Spede® or Dynaspede® Drive, with electronic control and pushbutton station, satisfies the requirements of almost any application where proper machine operation or material processing depends upon control of operating speeds.

The compact control panel may be remotely mounted to conserve valuable space on the driven machine. The pushbutton station at the operator's position puts vital controls conveniently at the operator's fingertips and requires a minimum of space.

Speeds are infinitely adjustable from 0 RPM to full output speed, and accurate speed regulation may be obtained from 100 RPM to full output speed.

Ajusto-Spede® Drives, available in ratings of 1/4 horsepower to 75 horsepower, are air-cooled. Dynaspede® Drives, rated from 3 to 75 horsepower, are liquid-cooled. Raise your productive efficiency with Dynamatic eddy-current units.

DYNAMATIC®
AJUSTO-SPEDE DRIVE



Send for Illustrated Literature Describing Dynamatic Adjustable Speed Drives

EATON

DYNAMATIC DIVISION
MANUFACTURING COMPANY
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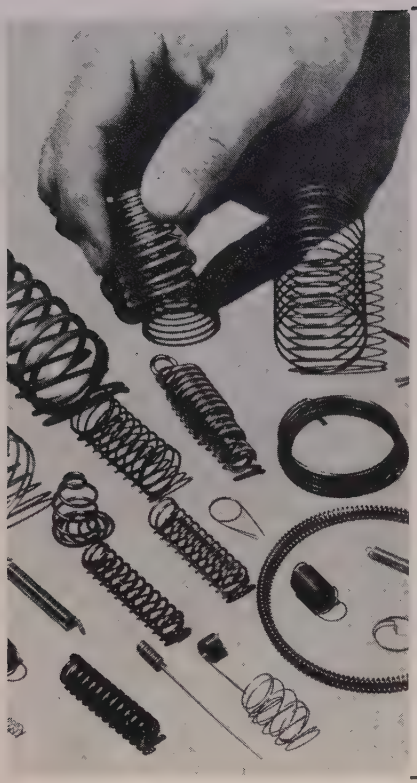


Properties of Stainless Spring Wires

Material	Elastic Limit	Modulus x 10	Fatigue Resistance	Elevated Temperature Resistance	Nonmagnetic	Corrosion Resistance
302	Good	10	Fair	Fair*	No	Excellent*
304	Good	10	Fair	Fair*	No	Excellent*
305	Fair	10	Fair	Fair	Yes*	Excellent
316	Fair	10	Fair	Fair	Yes*	Excellent*
321	Fair	10	Fair	Fair	No	Excellent
347	Fair	10	Fair	Fair	No	Excellent
17-7 PH	Excellent*	11*	Fair	Excellent*	No	Excellent
420	Good	11*	Fair	Excellent*	No	Good
430	Good	11	Fair	Fair	No	Good

*Properties that are outstanding in the material for use as springs.

How To Pick Stainless Springs

Generally selected to withstand particular corrosion conditions, stainless alloys vary widely in physical properties. Study each application carefully

BEFORE selecting a stainless spring for an application, carefully consider all the common types, suggests National-Standard Co., Niles, Mich., supplier of spring metals.

Analyses with slightly modified formulas to afford special corrosion qualities under certain operating conditions have different physical qualities.

Perspiration Pits Type 302—National-Standard engineers cite the experience of a manufacturer of sunglasses. Temples (earhooks) were fabricated of gold-plated Type 302 stainless. The alloy was selected because it has desirable spring properties, is easily formed, plates adequately, and normally has excellent corrosion resistance.

But field tests showed corrosion of the stainless steel where the gold plating had worn away. It was pit-type corrosion caused by the salt and acid in perspiration. The problem was solved by substituting Type 316 stainless, which is especially resistant to corrosive media containing salt.

17-7 Fills Strength Specs — A more complicated problem involved a chemical process device where space was at a premium. Music wire has ideal spring characteristics because of its high tensile strength but was unsuitable for this application due to possible exposure to corrosive solutions.

Normally, Type 316 stainless would have been specified for this application. But the space available for the spring was so small that a Type 316 component that would fit lacked sufficient energy storing ability to make the flow control device foolproof.

National-Standard engineers recommended 17-7 PH wire. It has excellent corrosion resistance, and by cold working the wire to high tensile strength and precipitation hardening to a higher strength after forming, the superior physical properties of music wire spring were approximated.

Temperature Creates Problems—An aircraft designer needed a high

energy spring to fit into a small cavity in the brake housing. There was no special corrosion problem, and normally music wire would have been chosen as the spring material.

Music wire was unsuitable, however, because of the high temperature generated in the housing during braking of the aircraft. The high temperature would reduce the music wire's tensile strength and reliability.

The solution to the problem was 17-7 PH wire. The safety factor offered by its high temperature performance eliminated the possibility of brake failure.

Type 305 Is Nonmagnetic—Increasing use of electronic servomechanisms poses special problems for spring designers. One application required placing a spring close to a vacuum tube circuit, and it was essential that the spring be nonmagnetic to prevent interference with the circuit.

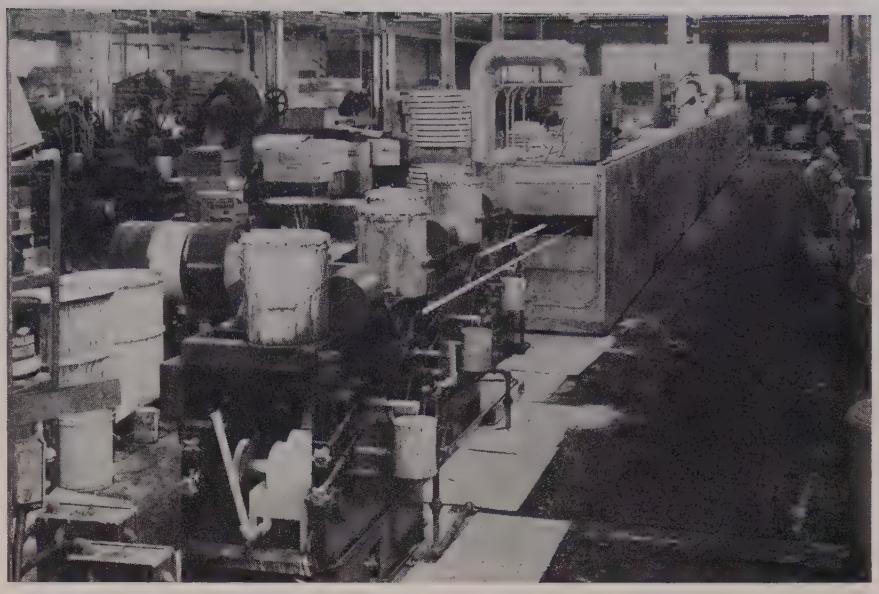
Nickel and copper alloy spring materials qualified on the basis of nonmagnetic properties. But the elastic limit of the nonferrous alloys is too low to meet requirements of this application. Type 305 was selected because of its excellent physical properties and the fact that it is also nonmagnetic.

Metal Withstands Creep

National Alloy Div., Blaw-Knox Co., Pittsburgh, has developed a new high temperature alloy to meet demands for a metal which has greater creep strength than 35-15 and for temperatures below that of NA 22H.

Castings made from the new alloy, called NA3, will sell for less than the same casting made from 35-15, say company officials. The material is recommended for use at temperatures below 2000° F. It is being used in furnace trays, shafts, mill guides, support castings, radiant tubes, and other heat resistant applications.

National Alloy claims that tests show NA3 to be superior to 35-15 in thermal fatigue, resistance to creep, and surface stability either in oxidizing or low oxygen pressure atmospheres. Its resistance to carburization is equal to that of 35-15.



Roller coater (left) handles three strips at once, coating both sides evenly. Strips travel through baking ovens (background) and are recoiled automatically

Roller Coating Eases Cost

Strip gets painted before being formed into drapery hardware. Better control of thickness means less paint used and high quality. Side benefit: Less handling

FACED with high finishing costs, Stanley-Judd Div., Stanley Works, Wallingford, Conn., turned to roller coating for drapery rods.

Results: Costs are down some 40 per cent; racking and hanging for drying are eliminated; and scheduling is easier for production control.

Rolls It On—Formerly, parts were rolled, formed, then electrostatically painted. It was difficult to adequately cover intricate inside corners. Too much paint was used in some areas.

Roller coating was selected because strips can be painted before forming. The system, made by Gasway Corp., Chicago, puts a 0.008-in. coat on one side and 0.002 in. on the other. Strips are 0.015 to 0.040 in. thick and up to 3.5 in. wide.

Starts with Coil—Steel or aluminum for the rods comes in coils which are mounted on three payoff reels. Strips pass through an accumulator to insure continuous operation of the line during changeover.

Several washers prepare the surface before it reaches the roller coater. (The treatment can be phosphatizing, chromating, or one of several similar processes.) After a final rinse and drying, the strip passes into the coater.

After paint is applied to both sides, strips pass through a baking oven. The pull-through reels apply tension to keep the strip level during drying. Rewind reels coil the painted stock.

The line handles three strips at once. Each can be painted a different color. Each can be adjusted to travel at separate speeds. All three strips pass through washers, ovens, and treating tanks.

The new roller coating system eliminates the manual part of processing.

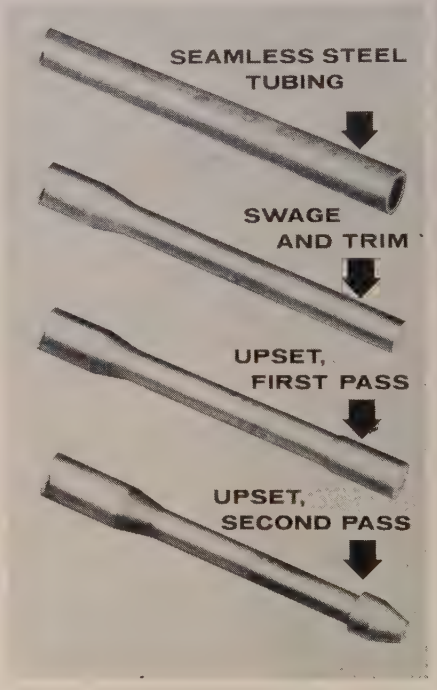
Better Tube Mandrel

Improved one needed for Assel mill use; Copperweld division designs it from seamless stock

TURNING one of its own products to its own use, Copperweld Steel Co.'s Ohio Seamless Tube Div., Shelby, Ohio, has come up with an improved mandrel for Assel mills.

In the Assel tube mill, a mandrel rides through the rolls inside the tube, forming a core around which the tube is worked and reduced. After the tube has passed through the mill, the mandrel is pulled out.

The mandrels formerly used by Ohio Seamless Tube had ends made of solid bar stock. They were heavy, and it was an expensive job hogging the gripper nose out of the solid bar, which was then welded to a long tube.



Steps in the manufacture of an Assel mill mandrel from seamless tubing

Success by Swaging — The mandrel design was improved by making the whole thing out of a single length of tube. First the tube is necked down at the ends by swaging. Then the extreme tip of the swaged end is gathered by upsetting and forged to a conical nose in a second pass through the upsetter.

Forging the nose produces a stronger and lighter mandrel made entirely of a "home grown" product. Better yet, cost has been cut about one-third.

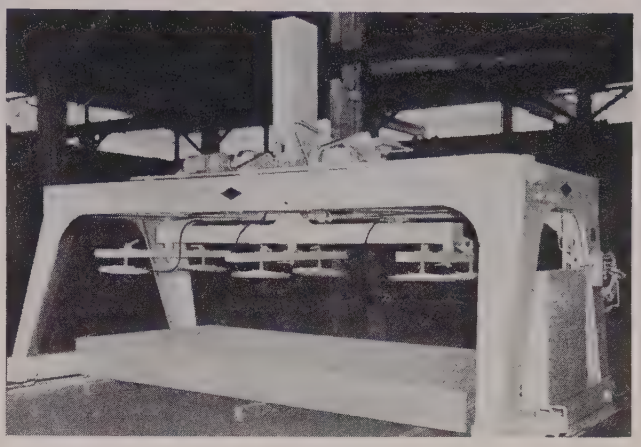
Unit Feeds Plates To High Speed Press

A 5000-lb automatic plate handler for feeding high speed shearing or press brake operations has a rotatable lift beam.

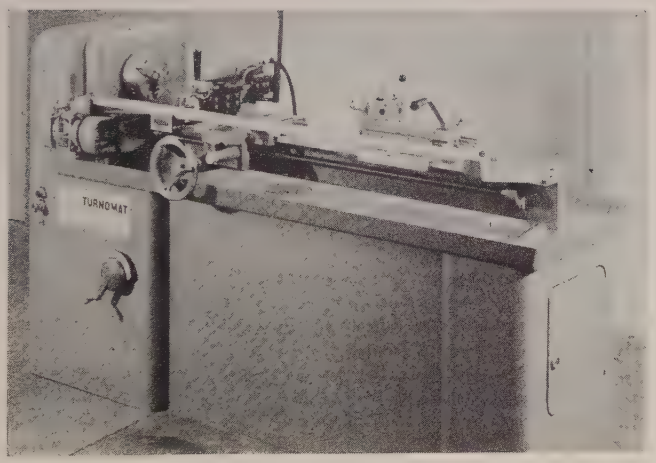
It permits direct feeding for either end for edge shearing or forming.

The handler will pick up plates from either of two stockpiles and deliver them to the machine feed table at 240 fpm. Hoist speed is 60 fpm. The frame is equipped with six adjustable vacuum cups with a lift capacity of 1000 lb each.

The unit will handle plates up to 16 ft long in transverse position for edge feeding. Longer plates can be handled in longitudinal position for end shearing. *Write*: Noble Co., 1760 Seventh St., Oakland, Calif. *Phone*: Templebar 2-5785



Lathe Eliminates Cams, Gears, and Multiple Cutting Tools



The Turnomat is a multipurpose, precision, centerless lathe for one pass, one plunge turning of all types of metals.

It operates without the support of headstock and tailstock centers or steady rests; the traveling spindle collet and single point tool move along the bar stock as a unit.

It will produce workpieces of infinite lengths, tapers, and contours with fine machine finish within a tolerance of 0.0005 in. or better.

Long or short runs are economically produced with minimum expense for tooling because all turning operations are accomplished with the same single point cutting tool. This eliminates the expense of cams, gears, and multiple cutting tools. *Write*: Taber Instrument Corp., Section 257, North Tonawanda, N. Y.

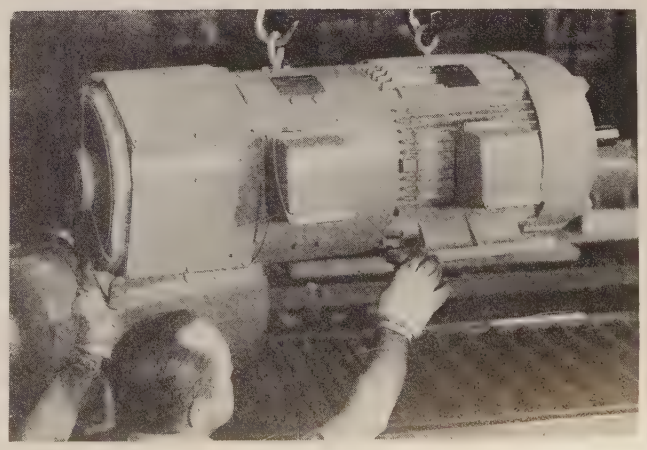
Drive Gives Continuously Variable Speed Control

The Rectiflow packaged adjustable-speed drive integrates an alternating current motor, a direct current motor, and semiconductor rectifiers on a single output-shaft. It provides continuously variable control over speed ranges of 1½ to 1, 2 to 1, and 3 to 1.

All power requirements are supplied from normal alternating current systems.

Available in ratings of 7½ to 125 hp (and higher), they can be designed to serve constant torque or constant horsepower applications.

Full load efficiency over the entire speed range is 85 per cent for 125-hp units, and not less than 80 per cent for lower horsepower. *Write*: Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa. *Phone*: Express 1-2800

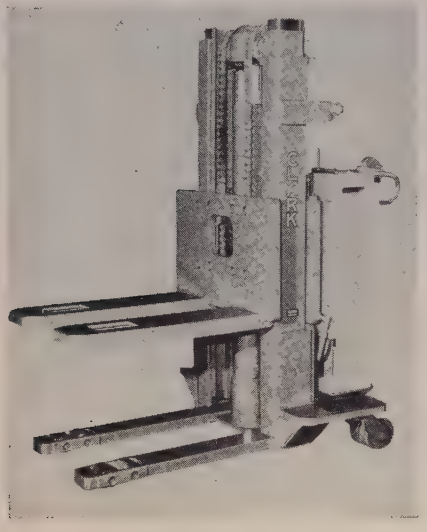


NEW PRODUCTS and equipment

Two Truck Units Added

Two high lifting units have been added to the Powrworker battery-powered hand trucks.

The High Lift pallet truck illustrated is designed to handle single-face pallets. The platform model is available in 36 through 60 in. lengths. Both will lift 4000 lb loads 130 in. or more. Over-all width is 42½ in.

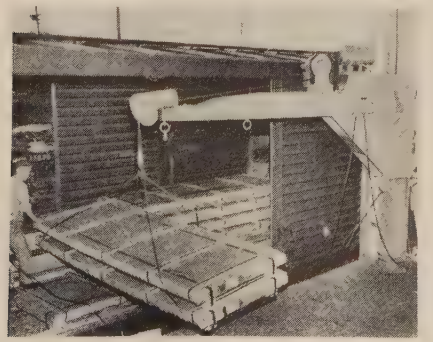


Both units have articulated drive units which raise or lower 3 in. to compensate for uneven floor conditions. *Write*: Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich. *Phone*: Woodward 2-6561

Crane Reaches into Car

Boxcar unloading time can be reduced with this jib crane. Its boom, which is raised or lowered by electric controls, reaches through the door of a car to cover its interior as well as a wide dock area.

A swivel fairlead permits directional loading. Controlled lateral movement of the load inside or outside a car is possible, and nose-diving and other forms of lost motion are reduced.



The crane can be used to pull the car along the siding. *Write*: Young Iron Works, 2959 First Ave. S., Seattle 4, Wash.

Seamless Tubing Redrawn

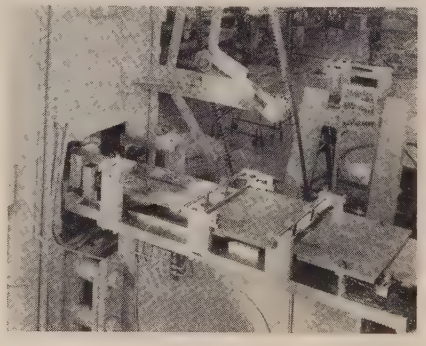
Redrawn seamless aluminum tubing in wall thicknesses thinner than present commercial limits on large outside diameters are offered from ¼ to ⅝ in. outside diameter, 0.010 down to 0.002 in. in wall thickness, and up to 5 ft in length.

The tubing can be cut to specified lengths and fabricated, if desired. Small parts up to 12 in. can be given an anodized coating for corrosion resistance or electrical insulation. *Write*: H & H Machine Co. Inc., Norristown, Pa.

Feeder Speeds Operation

The Flexofeed press feed arrangement hitch-feeds material at 2200 to 2500 ipm with accuracy to ±0.002 in. That permits high speed stamping of work with long or short increments from coil stock.

The equipment is used in conjunction with a standard Flexopress using conventional dies.



Feed strokes up to 36 in. are termed feasible. *Write*: Precision Welder & Flexopress Corp., 3520 Ibsen, Cincinnati, Ohio. *Phone*: Elmhurst 1-3300

Short Distance Handling

Two similar hand trucks meet requirements for fast handling of loads for short distances. Model AB has a capacity of 2500 lb; Model AEZ, 4000 lb. Both have 180-degree turning radiuses.

Model AB comes in standard platform widths of 17½, 24, and 26⅜ in.; Model AEZ has widths of 17¾, 24, and 26½ in.

With either, the operator can lift a load with the handle at any point within a 90-degree arc. Once the load is elevated, a self-locking lift hook disengages, freeing the handle. It stays upright and will not fly.

The trucks are equipped with hydraulic load releases which cushion descending loads. *Write*: Automatic Transportation Co., a division of Yale & Towne Mfg. Co., 149 W. 87th St., Chicago 20, Ill. *Phone*: Radcliffe 3-7000

CO_2 Protects Machines

Automatic fire protection for a milling machine is provided by this system. It will smother fire almost the second it starts. Rate-of-temperature-rise elements are placed above danger areas. At the first sign of flame, they trigger a cylinder of carbon dioxide. The CO_2 is discharged from Multijet nozzles.

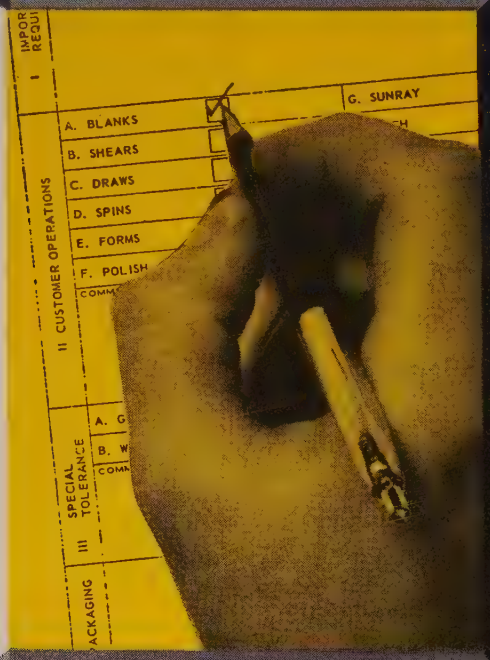
Pressure-operated trips and switches can be built into the carbon dioxide piping and are actuated by the passage of the gas. They can turn off motors and fans, close dampers, or sound alarms. *Write*: Walter Kidde & Co. Inc., 260 Madison Ave., New York 16, N. Y. *Phone*: Murray Hill 3-4900

Hot Hardness Testing

The Model 6-JR Hot Hardness Tester, utilizing a Rockwell tester in conjunction with a small electric furnace, represents an advance in the accurate determination of hardness properties and characteristics of metal at elevated temperatures.

The device can be used to determine the Rockwell hardness of metals, contained within the shell of a controlled atmosphere gas fur-

Zealous attention to detail: that's the Olin Aluminum way of saving you money...



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To achieve this, we cram our Customer Requirement Record with more detailed facts about your operations, needs, likes and dislikes than anyone else, we believe. But that's where we see our biggest future: in offering you personalized individual service that fits you like a glove.

If you'd like this kind of special attention and service, call the nearest of our 29 offices or write: Aluminum Division, Olin Mathieson Chemical Corporation, 400 Park Avenue, New York 22, N. Y.

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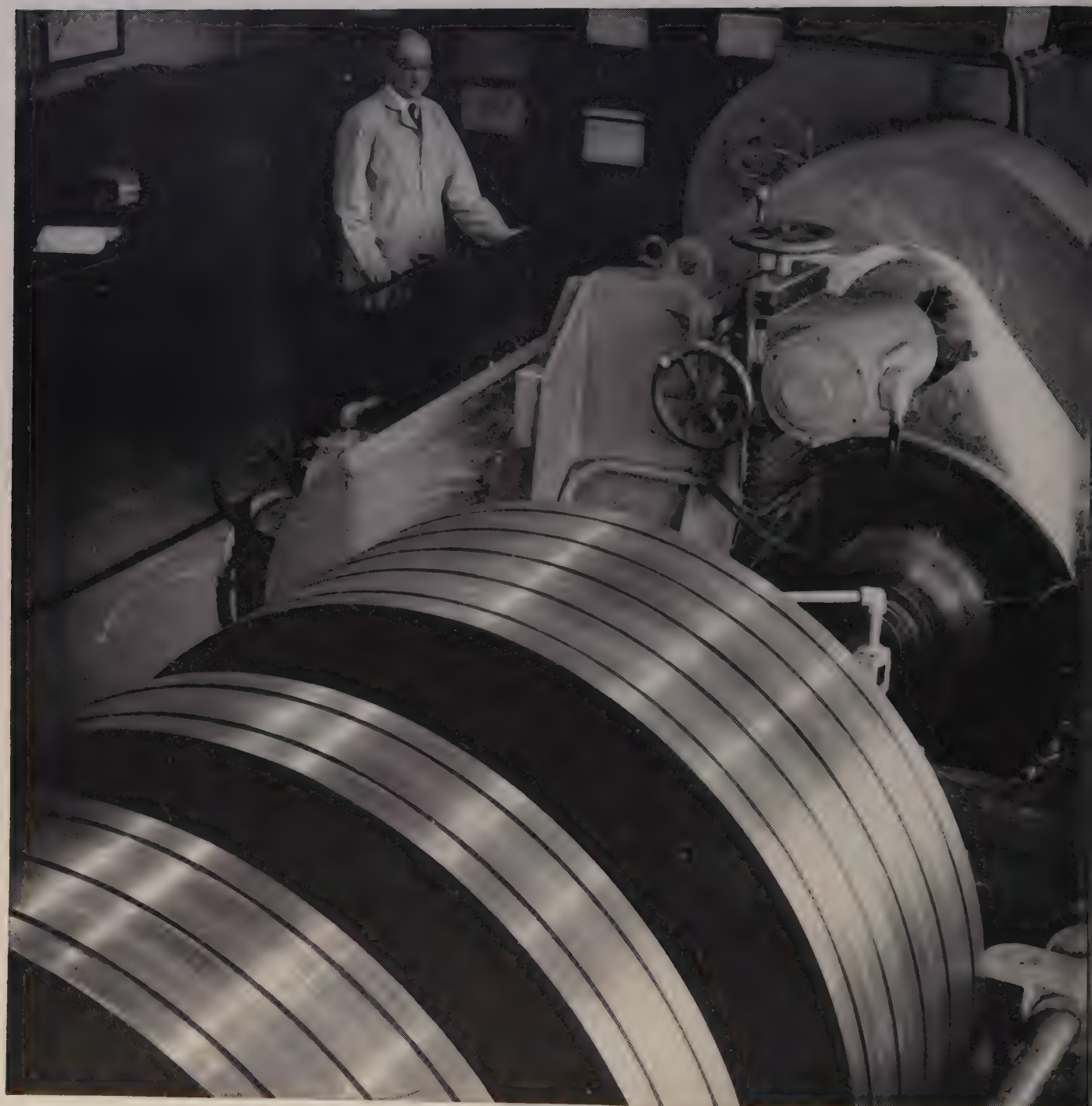

STEEL + PLUS IN ACTION: RESEARCH

A fast train is a safe train when it rides on high-quality USS Wrought Steel Wheels. To test wheels, U. S. Steel's Research Center at Monroeville, Pa., operates the world's largest inertia dynamometer. It operates at speeds equivalent to 160 mph, can generate 68½ *million* foot pounds of energy—enough to lift a 34,000 ton ocean liner a foot in the air. The tests indicate how changes in design, steel composition and heat treatment can further improve the quality and safety of USS Wrought Steel Wheels.

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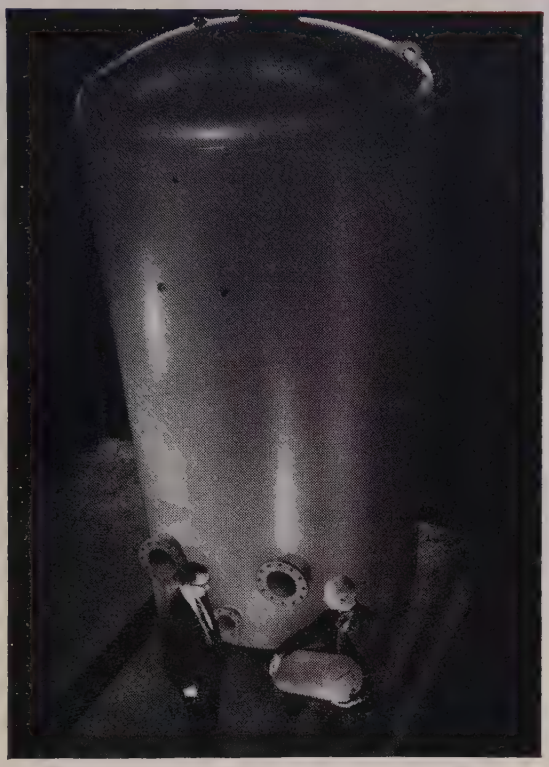


STEEL + PLUS IN ACTION: TECHNICAL ASSISTANCE

The Cemline Corporation makes a complete line of tanks, ranging from one gallon to 6,000 gallons —including the 15-gallon expansion tank and the 3,000-gallon steam-or-electric coil-heated water storage tank shown here. For Cemline's expansion tanks used in public buildings, USS metallurgists suggested a special quality steel which enabled them to meet a new and exacting safety code, yet produce the tanks economically.

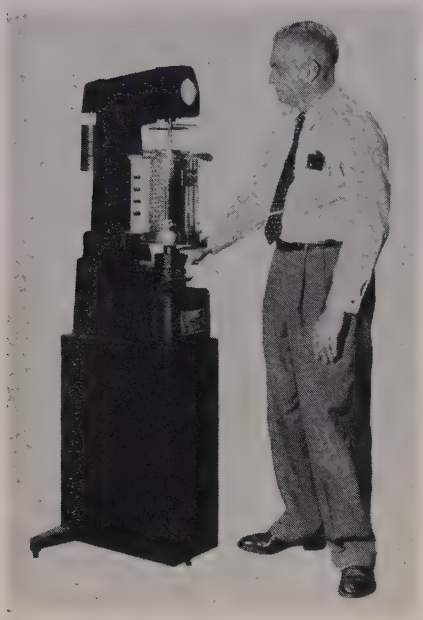
STEEL + PLUS IN ACTION: FACILITIES

Only United States Steel can supply pipe like this. It's called expanded seamless line pipe. The pipe is pierced from a solid billet of steel and hot-worked to size. Then, it is *cold expanded,* and this cold-working process results in improved welding properties, plus higher yield strength (at least 10% higher). The National Tube Division of United States Steel developed this new pipe, and it is available in diameters from 16 to 26 inches, in a full range of wall thicknesses.

STEEL + PLUS IN ACTION: MARKETING ASSISTANCE

United States Steel maintains a staff of market development specialists who work with customers, and *customers'* customers, to make the most effective use of products made from steel. The picture shows a member of our marketing team in action. L. to r.: Walter Nelson, Vice President, General Bronze Corp.; Charles LeCraw, USS Construction Specialist; John Starrett, Perkins & Will, Architects. They are working out details for a new, all-steel curtain wall building.

USS **United States Steel**

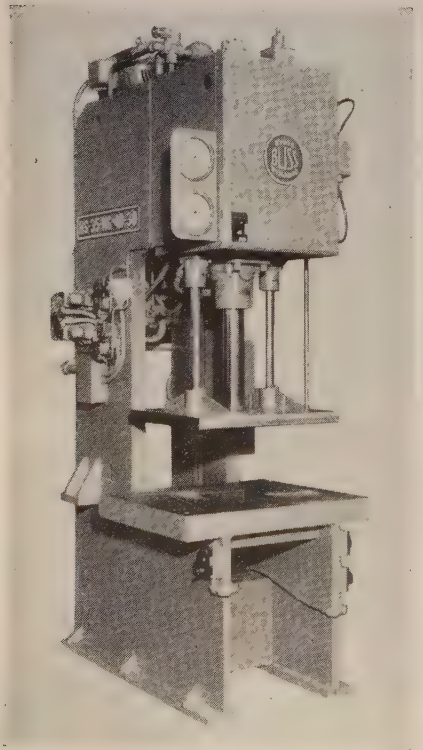


nace, at temperatures exceeding 1500° F. *Write*: Wilson Mechanical Instrument Div., American Chain & Cable Co. Inc., Bridgeport 2, Conn.

Press Has Large Bed

Low tonnage, gap frame hydraulic presses have expanded the Hydro-Dynamic line. Capacity range: 10 to 100 tons.

The presses incorporate high speed operation with quick advance speeds, slowed pressing and rapid returns. Because of large bed areas, they handle a wide range of part sizes and shapes. They have long, adjustable strokes.



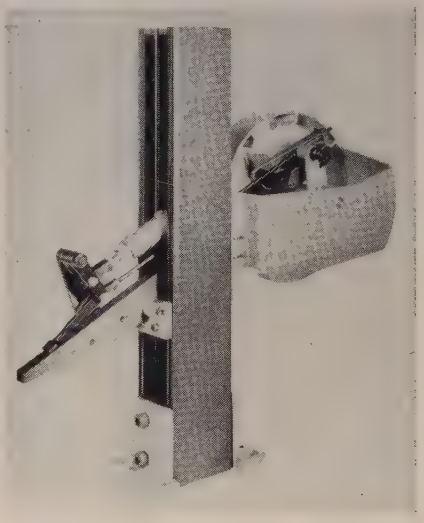
A variety of operations can be performed: Flash trimming, blanking, drawing, punching, perforating, and die spotting.

The 35-ton press illustrated has approach and return speeds of 693 ipm and a pressing speed of 100 ipm. *Write*: E. W. Bliss Co., 1375 Raff Rd. S. W., Canton 10, Ohio. *Phone*: Greenwood 7-3421

Feeder Is Air Operated

A compact, combination part feeder and escapement unit automatically places a broad range of small parts.

The unit, sold fully tooled or untooled, includes feeder, feed track, escapement mechanism, and a twin-rail mounting column.



Parts are controlled and fed by the action of a single dual-purpose air cylinder. *Write*: Dixon Automatic Tool Inc., 2300 23rd Ave., Rockford, Ill.

Stops Spatter Adhesion

Weld-Gard is a chemical compound that prevents the adhesion of weld spatter to surrounding metal surfaces.

It is nontoxic, nonflammable, and noncorrosive to ferrous and nonferrous metals. When applied, it forms a barrier that eliminates the need for wire brushing which might mar or scratch the finish.

This chemical and the weld spatter can be removed simply by washing with water. *Write*: Clarkson Laboratories Inc., 930 N. Darien St., Philadelphia 23, Pa.

NEW Literature

Write directly to the company for a copy

Acid Resistant Chain

A data sheet, DH-169, covers Acco X-weld acid pickle chain and X-weld Type 321 stainless steel chain. These chains are designed to provide optimum service in high temperature applications and in solutions of sulfuric or nitric acids used in pickling operations. American Chain & Cable Co. Inc., 929 Connecticut Ave., Bridgeport 2, Conn.

Drilling Layout Machine

Model 25-A Flex-O-Drill, a precision table-type machine, saves up to 50 per cent of the time required to make sheet metal layouts and templates by eliminating the need for a base line drawing and vernier height gage layout. It's described in a 4-page catalog. Wales Strippit Co., 210 S. Buell Rd., Akron, N. Y.

Production Control

An 8-page brochure describes Telecontrol, a production control system that links all productive machinery to a central monitoring room. Visual and recorded data give minute-by-minute information on machine operation and the progress of the work. Control Systems Co., a division of Hancock Industries Inc., Jackson, Mich.

Crane Rails

Catalog 464, "Bethlehem Crane Rails," 22 pages, describes the manufacture of crane rails, provides directions for jointing, welding, and selection of proper sections. Bethlehem Steel Co., Bethlehem, Pa.

Chemical Milling

Design Bulletin No. 6 will help design and production personnel to gage what chemical milling can do for them. It gives the stages at which inspections are performed, the tolerances that are obtainable, and the surface finishes that will result on aluminum, steel, magnesium, and titanium. United States Chemical Milling Corp., 1700 Rosecrans Ave., Manhattan Beach, Calif.

Large Diameter Pipe

A 28-page booklet details the step-by-step production of large diameter steel pipe, and lists weights, grades, and specifications for all sizes from 20 to 36 in. outside diameter. Welland Tubes Ltd., 100 Church St., Toronto, Ont.

Portable Sound Control

A 4-page brochure describes Acousto-sorber, a lightweight, portable sound absorbing unit for general building and industrial plant applications. Installation photos and a sound reduction rating chart are included. Dept. 136, United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill.

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Baldor Electric Company
The Brown-Brockmeyer Company
Century Electric Company
Cleveland Electric Motor Company
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Diehl Manufacturing Co.
Doerr Electric Corporation
Electro Dynamic
Electric Machinery Mfg. Co.
Elliott Company
Emerald Motor & Mfg. Co.
Emerson Electric Mfg. Co.
Fairbanks, Morse & Co.
General Electric Company
Howell Electric Motors Company
The Ideal Electric and Manufacturing Company
The Imperial Electric Company
Iron Fireman Manufacturing Co.
Jack & Heintz Inc.
Kingston Conley Incorporated
The Leland Electric Co.

The Lima Electric Motor Co., Inc.
The Lincoln Electric Company
Marathon Electric Manufacturing Corporation
Marble-Card Electric Corporation
The Master Electric Company
Oak Electric Motors, Inc.
Packard Electric Division
The Peerless Electric Company
The Piqua Machine & Manufacturing Co.
The Reliance Electric & Engineering Company
Robbins & Myers, Inc.
Reuland Electric Company
The Springfield Electric Motor Co.
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Sterling Electric Motors, Inc.
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A. O. Smith Corporation
Oster Manufacturing Company
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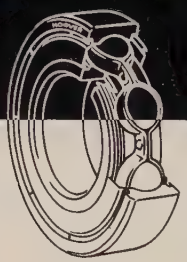
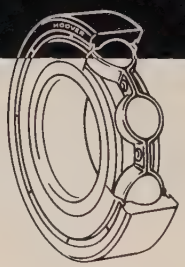
Constantly sought by manufacturers and users is velvet smooth operation of electric motors that whispers "*superb quality*."

In many leading makes of motors, as well as other products, hushed quietness is assured through the use of Hoover Quality Ball Bearings. Precision made with super smooth *Hoover Honed* Raceways and perfectly matched *Micro-Velvet* Balls, Hoover Ball Bearings are exceptionally quiet, exceptionally dependable, exceptionally long lived.

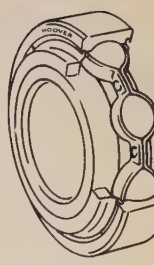
You, too, can put these Hoover advantages to work . . . in the products you build, in the equipment you operate.



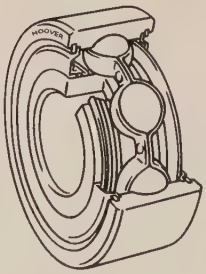
Contact Seal



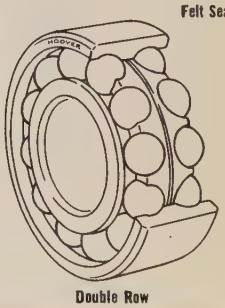
Shield Type



Felt Seal



Cartridge



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Average size of bale. . 20" x 34" x 16"

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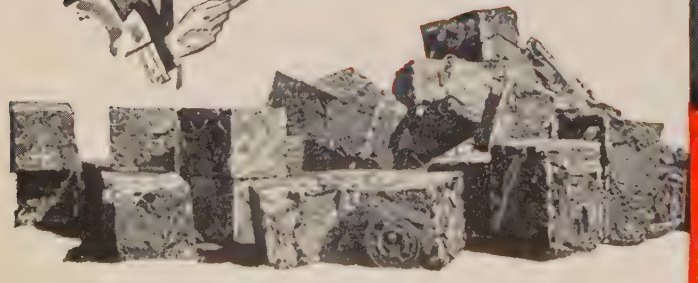

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Market Outlook

Steelmakers Abandon Premium Prices

INEVITABLE as price cutting might seem when steelmakers fight for business, last week's move by Great Lakes Steel Corp. has most of the experts guessing.

They're wondering why National Steel Corp.'s Detroit subsidiary should abandon its $2-a-ton price differential only three weeks before higher employment costs become effective. On July 1, wage and fringe benefit costs are going up about 20 cents an hour, steelmakers estimate.

It's believed that Great Lakes's customers forced the issue, demanding to know why they should pay $123 a ton for cold-rolled sheets when McLouth Steel Corp., another Detroit producer, was quoting $121. McLouth has undersold Great Lakes for more than two years, but during good times, it shipped only to General Motors Corp. Having idle capacity, it may be going after Great Lakes's accounts.

NO MORE DIFFERENTIALS?— By eliminating the $2 differential, Great Lakes brought its prices into line with those quoted by Pittsburgh and Chicago mills. To remain competitive, they'll have to absorb $2 more freight on shipments to Detroit. Recalling that Granite City Steel Co. pared its differential from $4 to $2 a ton two weeks ago, some industry observers predict an end to premium selling—long justified by out of the way producers on the ground that they had to pay more for their raw materials.

HIGHER PRICES COMING— In spite of the reductions announced by some steelmakers, there's no change in the price outlook. When wage rates go up on July 1, steel prices will almost certainly be increased. Public opinion, reduced demand, and competition from other metals are restraining influences, but they won't prevent a "moderate" hike. Probable increase: About $5 a ton.

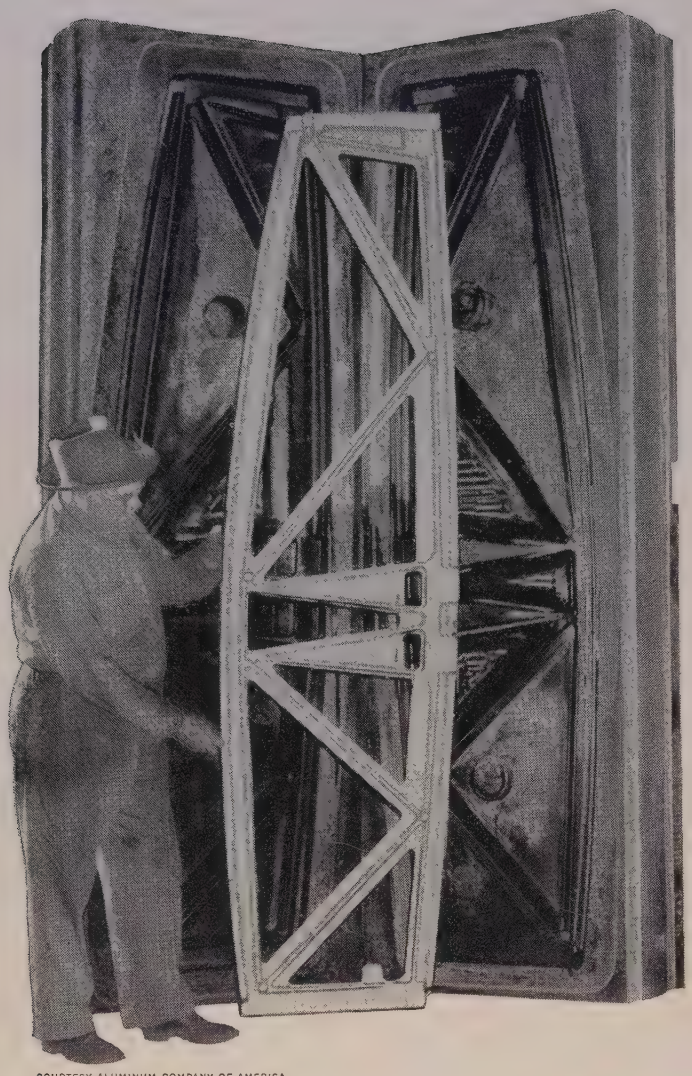
AUTOMAKERS CUT STOCKS— During the first quarter, automakers assembled about 30 per cent fewer cars than they did in the like period of 1957. From January through March, steel products shipped to the automotive industry declined by 42 per cent, indicating that car builders were living off their inventories. When production of 1959 models begins, steel shipments will have to increase sharply to make up the inventory deficit.

PEAK PRODUCTION— Last week, steelmaking scored its seventh consecutive advance. Furnaces were operated at 64 per cent of capacity, up 3.5 points. Their output was about 1,725,000 net tons of steel for ingots and castings, the highest of any week this year. Since hitting a low point in April, production has increased by 35 per cent. If operations continue at the current rate, June's output may top January's 6.75 million tons.

MILLS HEDGING— Better steel production reflects improved demand generated by construction activity, replacement of depleted inventories, and hedging against a possible price increase. In some cases, it also reflects a mill's desire to save money on semifinished steel by turning out as much as possible before labor costs go up.

JULY OUTLOOK GRIM— Although they're elated by June operations and sales reports, steelmakers expect to hit the skids in July. They're afraid production may drop to the April level or lower. Reasons: Several automakers (possibly Buick, Oldsmobile, and Pontiac) will shut down for model changeovers. Other customers will close their plants for vacations. Those who bought heavily in June for price protection will be out of the market in July.

WHERE TO FIND MARKETS & PRICES



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Finkl FX die blocks are noted for their long production runs and economy because

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U. S. Scrap Exports Tumble

(Shipments in gross tons)

1958	3,900,000*	1955	4,537,372
1957	5,921,149	1954	1,345,786
1956	5,362,710	1953	271,179

*Estimated by STEEL.
Source for other years: Institute of Scrap Iron & Steel Inc.

Leading Buyers of American Scrap

(In net tons)

Avg of Jan.-Feb., 1958		Avg Month, 1957	
Italy	94,422	Japan	197,758
Canada	63,213	Italy	131,854
Japan	59,025	Canada	62,118
Mexico	27,927	West Germany	54,912
West Germany	20,607	U. K.	30,811
France	16,865	Mexico	27,381
Spain	5,331	Belgium-Luxembourg	21,231
Belgium-Luxembourg	2,561	France	19,354
U. K.	0	Spain	8,711

Source: Commerce Department.

Exports of Scrap Fall

Japan and Europe make cuts following record purchases in 1957. U. S. consumers still fight loss of vital raw material, but they haven't as much ammunition as in '57

THE SCRAP EXPORT controversy isn't as vigorous this year as last, but don't think it's a dead issue. Foundrymen and some steelmakers still object to exports. Sellers back free trade.

In 1957, wrangling rose to fever pitch as scrap shipments to foreign countries reached a record 5,921,149 gross tons. That total compiled by the Institute of Scrap Iron & Steel Inc., Washington, represents a gain of more than 10 per cent over the previous record of 5,362,710 gross tons, set in 1956.

Basis of Contention — Domestic consumers alleged that flow of scrap out of the country caused a shortage of a vital raw material in the U. S. Foundrymen and steelmakers said this shortage forced their scrap costs higher. Scrap dealers claimed there was enough for everyone.

With scrap in free supply, open-end export licensing of the material is the rule in 1958, the Bureau of Foreign Commerce said last March. BFC believes supplies are ample for both domestic and foreign needs.

Fewer Arguments Now — Purchasers can't object strenuously to exports this year. Their consumption is down. The Bureau of Mines reports that stocks of ferrous scrap held by U. S. consumers on Mar. 31 totaled 8,090,000 gross tons, 2 per cent higher than on Feb. 28 and the second highest quantity ever held by consumers. Scrap consumption in March, this year, was 41 per cent lower than in March, 1957.

A second cause of lessened vigor in the fight is reduction in tonnage leaving the country. Dollar shortages, import restrictions, a freer supply of scrap abroad, and lower production rates in several countries trim foreign demand. Commerce Department statistics show exports in the first two months of 1958 were 47 per cent below year-ago figures.

First quarter scrap exports are estimated at about 925,000 gross tons. Predictions of total 1958 exports are slightly below 4 million gross tons. That's far enough under last year's total to insure that quotas won't be instituted in 1958.

Changing Export Trends—Some of this country's best customers cut their scrap buying sharply this year. Commerce Department statistics show that Japan was the leading importer in 1957 with a take of 2,373,101 net tons. That nation fell below Italy and Canada in the first two months of this year with purchases of only 118,050 tons. Says a STEEL reporter on the West Coast: "There is a lot of talk but little business in sight in exports to Japan."

In Europe, minor cutbacks in steel production, import regulations, and greater supplies of domestic scrap trim purchases of the U. S. commodity. Exports to Belgium, Luxembourg, and Great Britain totaled 68,954 net tons in the first two months of 1957. This year's January-February total: 5122 tons.

Italy's purchases of U. S. scrap fell from a January-February, 1957, total of 289,874 net tons to 188,-

844 in the same period of 1958; West Germany's from 82,996 to 41,213.

Some Take More — Our neighbors increased their buying moderately in early 1958. In January and February, Canada and Mexico upped their buying by 2 per cent over the average month of 1957. Canada's imports of 126,426 tons in January and February make that country the second largest foreign customer for U. S. scrap.

Hamilton, Ont., mills are importing auto bundles from Detroit, where prices are low enough to be attractive. Some Hamilton foundries buy cast scrap from Buffao.

Canadian mills are busier than U. S. mills, but shipments to that country are beginning to fall as supply of Canadian scrap improves and output of scrap at U. S. auto plants declines.

Over-all reductions in foreign demand bring a lull in exports, but some U. S. scrap buyers fear that the situation will be only temporary. Says a foundryman: "Exports of 3.9 million gross tons this year would still be well above 1954's total of 1.3 million tons. We admit that our demand for scrap is low, but we are still opposed in principle to exports. We need the material here. Only the best grades are commonly exported. When our production grows and our need for scrap increases, we're afraid we'll discover that good scrap is scarce and expensive. That could happen as early as next year."

Sheets, Strip . . .

Sheet & Strip Prices, Pages 144 & 145

There has been a mild flurry of June buying of sheets, a substantial part of it being a hedge against a July 1 price increase, but sheetmakers are not kidding themselves into thinking that the long-awaited turn for the better has come. June shipments will exceed those in May by a good margin, but, most producing mills anticipate a drop in demand next month.

"We've had a lot of activity in the last 10 days," says a sales executive at Pittsburgh, "and if the trend continues, our shipments should be 10 to 15 per cent better this month than they were in May.

"Most of the business originates with customers outside the automotive, construction, and appliance industries. Sales to manufacturers of heating equipment are up seasonally, and shipments to customers who convert sheets to welded tubes have been pretty good. Construction demand for piling hasn't been up to expectations."

Competition Keen—It's reflected in action by Great Lakes Steel Corp., Detroit, in reducing its prices $2 a ton by eliminating its freight differential over producers shipping into the district from other producing areas.

The move, as with Granite City Steel Co. about 10 days ago, was defensive. Outside producers will have to absorb $2 a ton more freight now to get into the Detroit area. All leading sellers say they will continue to compete for business in the district, absorbing the additional freight on desirable tonnage.

In New England, sheet and strip orders are lower. The mild flurry in buying for June shipment, with

some July tonnage moved forward, has subsided. In most cases, buyers have insisted that unless shipment of additional tonnage was made this month, it would be canceled. Price-hedge buying of higher cost specialties has been light in the district. No substantial rebound in buying is anticipated until August.

Little Hedging — At St. Louis, sales officials say there is virtually no evidence of hedging against a July price boost. Occasionally, orders are tagged, "Must have in June," but such cases are reported to be "extremely limited." The majority of customers of Laclede Steel, for example, are ordering only for normal requirements.

Leaders in the Chicago area indicate mills producing wide, hot rolled sheets and galvanized sheets are engaged at capacity this month. Still, they can make deliveries during the first two weeks of July on all products except tin plate and galvanized sheets. They don't expect much tonnage will be canceled if they are unable to make June delivery. They sold little tonnage with the promise it would be delivered this month. Still, many consumers will be disappointed if they don't get June shipment.

See Fair Quarter—From an overall standpoint, indications are that third quarter sheet volume will better that in the second quarter—despite a lag in business next month. That is expected because of continued shrinkage in consumer inventories, and the probability of an improvement in auto tonnage in the latter part of the period.

Significantly, the Jones & Laughlin Steel Corp. plant at Cleveland, which has been virtually idle since February, is scheduled to resume production on a steadily expanding scale in the first week of July. That action is taken to indicate J&L sees a decided improvement in demand for flat-rolled steel over the next several months.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 143

Construction steel products, such as fabric, prestressed strand, and reinforcing bars, are doing noticeably better volumewise as the building season moves along. Much of going tonnage is for public projects, such

as highways, bridges, and schools.

The pickup in activity is general, except, at Cleveland—a strike of building labor there is in its second month.

Steel Bars . . .

Bar Prices, Page 143

A sudden rise in June orders for cold-finished bars caused a Pittsburgh producer to step up operations to five days a week. It had been on a four-day schedule. The increased demand partly reflects hedge buying against an expected price hike July 1.

Bookings and shipments will be better this month than in May.

A Pittsburgh mill reports its sales so far this year have been 50 to 60 per cent below those in the like 1957 period.

Auto buying is up slightly, and parts manufacturers are ordering greater tonnages now that they've determined the parts are going into 1959 models.

Warehouse orders are helping sales of cold-finished bars. One mill executive said last week: "One of our warehouse accounts told us last month that it had succeeded in balancing its inventory. Now it's ordering as much as it ships."

Plates . . .

Plate Prices, Page 143

Consumers are hedging against a price increase July 1. Plate business is slightly more active than it was. In the East, plate specialties are moving well. Heads for pressure vessels of various descriptions are in demand. Plain plates are moderately active, with tonnage available by mid-July. Ship needs continue outstanding, but railroad equipment requirements are light.

Convinced that hedging is at least partly responsible for the sudden upturn in buying, some producers at Pittsburgh are resisting customers' demands that they guarantee shipment by June 30.

Fabricators who have enough business on their books to forecast their steel requirements (also enough cash) have no qualms about loading up with tonnage. They think steel in their yards will be worth more than money in the bank come July 1.

Among consumers who are not hedging is a manufacturer of elec-

trical equipment. His use of plates has dropped so much lately that he won't be back in the market until late July. Orders originally scheduled for July delivery are being held off until September.

Tubular Goods . . .

Tubular Goods Prices, Page 147

Tubular goods are moving better as the building season advances, but demand continues sluggish with buyers largely depending on inventories. Demand has sufficiently improved, though, to necessitate a slight pickup in production at some pipemaking centers.

Youngstown Sheet & Tube Co.'s seamless pipe mills at Youngstown are furnishing some of the pipe for the world's deepest oil well. In Pecos County, Texas, the well recently passed the previous record 22,570-ft level, still 2000 ft from its prime objective. Sheet & Tube furnished the top 10,000 ft of X-95 drill pipe, 4½ in. outside diameter.

The company also is providing pipe for another deep well, Andarko Basin No. 1 in Caddo County, Okla. More than 24,000 ft of X-95 drill pipe is involved.

Wire . . .

Wire Prices, Pages 145 & 146

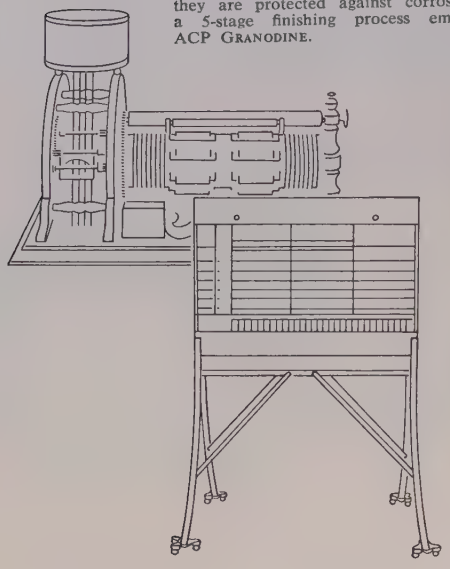
June shipments of manufacturers wire will be 50 per cent above the May level and about even with those in June, 1957, a Pittsburgh producer reports. The pickup is attributed to price hedging, inventory replacement, and improved automotive buying. Because of the upturn, this mill needs three weeks to deliver some items that it could have shipped within 10 days a month ago.

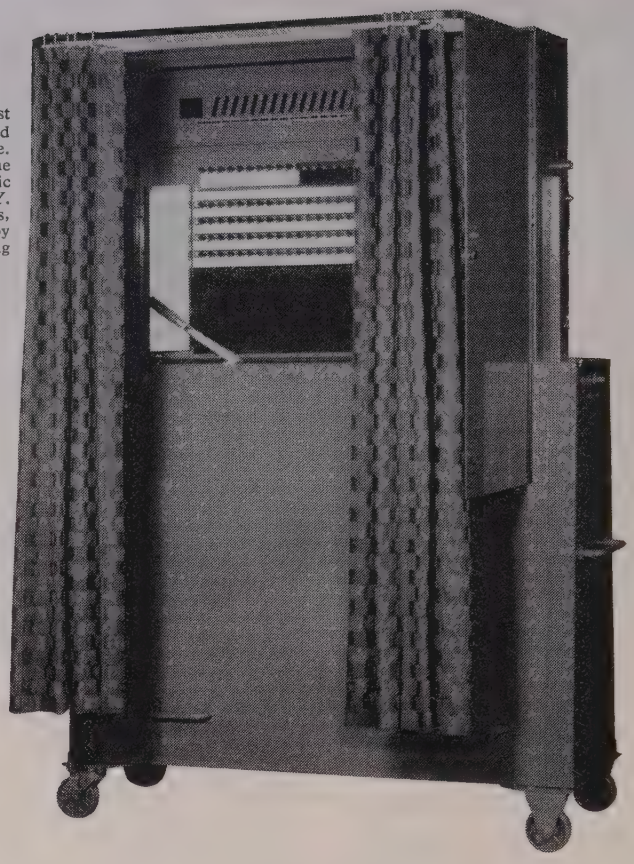
Automakers are taking delivery of small tonnages which they ordered during May, and additional shipments are going to their suppliers. There is little sign, though, of any pickup in buying of auto cushion spring wire. The same holds true on bedsprings.

Chicago district wiremakers customarily close their mills for two weeks in July for vacations, but right now they are trying to decide whether business is good enough to warrant partial operations by staggering vacations. They're now using two shifts on ten turns.

The adding of turns looks like

The automatic voting machine—first patented by Thomas Edison—is now used by almost half the national electorate. Most of today's machines, such as the one at right, are made by Automatic Voting Machine Co., Jamestown, N.Y. Self-storing and built to last for years, they are protected against corrosion by a 5-stage finishing process employing ACP GRANODINE.

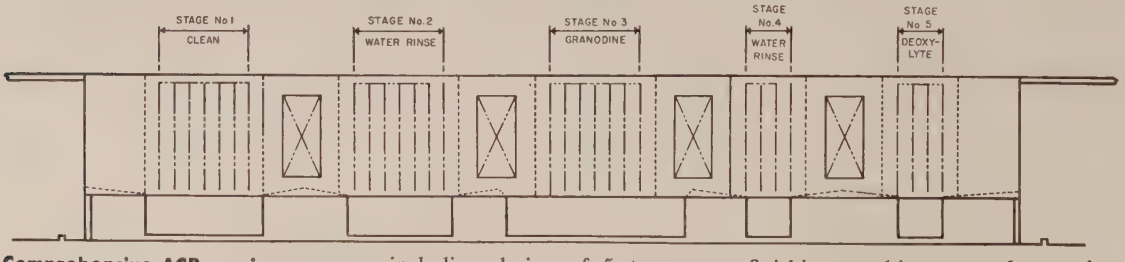




ACP GRANODINE ASSURES FIRMLY BONDED, CORROSION-RESISTANT FINISH ON VOTING MACHINES

There is a good chance that last time you voted, you cast your ballot on a machine like the one above made by Automatic Voting Machine Company, Jamestown, N.Y. Because these machines are necessarily in storage most of the time—often in unheated warehouses or basements of municipal buildings—it is essential that the metal be protected against corrosion. Automatic Voting Machine Company uses ACP GRANODINE for this reason. It chemically converts steel surfaces to a non-metallic phosphate coating. This not only increases adhesion of the finish, but also greatly improves the corrosion resistance of the finishing system, even when used in conjunction with a relatively thin and flexible paint film. ACP GRANODINE zinc phosphate coatings are economically applied by dipping, spraying or brushing. Why not investigate the advantages of ACP GRANODINE for your own finishing operation.

GRANODINE is a registered trademark of American Chemical Paint Company



Comprehensive ACP service program, including design of 5-stage spray finishing machine, was also an important reason why Automatic Voting Machine Co. standardized on ACP GRANODINE. Similar service is available to you in solving problems of corrosion, paint bonding, forming, drawing or other metalworking operations. Call on us.

Write for Bulletin 1380. *Describes the various types of ACP* GRANODINE; *gives the information you need to select the proper type for your particular application.*

AMERICAN CHEMICAL PAINT COMPANY, Ambler 19, Pa.

DETROIT, MICH. • ST. JOSEPH, MO. • NILES, CALIF. • WINDSOR, ONT.

CHEMICALS ACP PROCESSES

New Chemical Horizons for Industry and Agriculture

the only practical way of increasing operations. Men laid off in recent months have found other employment; they don't respond to return-to-work calls unless they can be assured of steady hours for at least several months.

Wiremakers in the Midwest think as much as 50 per cent of June business is hedge buying. Deliveries on most manufacturing products are five to six weeks. Merchant products are doing well with jobbers and co-ops buying freely. The position of the farmer is better. In the area, June shipments are 20 to 25 per cent above those in May, but they are below those in June a year ago.

Structural Shapes . . .

Structural Shape Prices, Page 143

Stronger demand for structural steel, including wide flange sections, is resulting in a stepup of rolling schedules at eastern mills. Deliveries are extended four to five weeks.

Bridge and public work account for the bulk of the improvement. Bridge tonnage would be more impressive were it not for the increased use of prestressed beams. In two state openings, June 26 and 27, New York and Pennsylvania, 28 prestressed structures are involved.

Structural fabricating shops are placing more tonnage with mills, but prices for steel in place are slow to recover ground lost in recent months, and steel tonnage placed now will cost more after July 1. With highly competitive conditions continuing, fabricators are skeptical about passing along any increase in their costs this summer. On one 1000-ton project near Princeton, N. J., bids were submitted by 23 fabricators.

Bethlehem Steel Co., Bethlehem, Pa., will fabricate 13,500 tons for the low deck of the George Washington Bridge, New York.

Warehouse . . .

Warehouse Prices, Page 148

Bookings by steel distributors are holding steady at about half of last year's volume. A slight improvement is noted this month in some districts, but buying is not brisk. Plates, structural shapes, and other construction items are in best demand.

Little hedge buying is reported, although some interests believe it may pick up later this month. Reason: Consumers feel they can depend on mills for quick delivery.

Inventories are no longer troublesome. Says one warehouseman: "We have plenty of steel, but not an excessive amount. At our current rate of sales, we have about three months' supply."

In the face of a possible price increase after July 1, price cutting is still prevalent in many districts, especially in the Southwest.

Ferroalloys . . .

Ferroalloy Prices, Page 150

Vanadium metal of 99.5 per cent minimum vanadium content is now available in commercial quantities from Vanadium Corp. of America, New York, which for many years produced it only on a laboratory scale. Various sizes are offered and at lower prices resulting from new production methods developed at the corporation's research center at Cambridge, Ohio.

The new prices start at $40 a pound in quantities of 250 lb and up. As-cast ingots carry an extra of $10 a lb, and machined ingots $20 a lb. Quantities under 250 lb carry quantity extras. All prices are f.o.b. Vanadis, Ohio.

Research is underway seeking to develop means for economically producing other forms, such as wire, sheets, and tubes. Use of the metal in atomic energy, jet and rocket aircraft, chemical applications, etc., is under study in many industries and federal and private research groups.

Pig Iron . . .

Pig Iron Prices, Page 148

Merchant pig iron sellers are experiencing the slowest business so far this year. Many consumers will close their plants for mass vacations beginning next month. Most will be longer than usual. Also close at hand is the time hot weather forces a curtailment of melting operations. For those reasons, coupled with the lag in general

business activity, there is little incentive to purchase iron for more than immediate needs.

The foundry trade looks for a gradual improvement in the flow of casting orders during the final four months of the year.

Jones & Laughlin Steel Corp., Pittsburgh, will blow in one of its two blast furnaces at its Cleveland Works Div. July 5. Pig iron and steelmaking facilities there were closed in mid-February to expedite completion of a modernization and expansion program. Reopening was postponed beyond the original target date of May 15 due to the overall letdown in industrial activity.

Semifinished Steel . . .

Semifinished Prices, Page 143

Steelmaking operations are at the highest level since mid-December. The national ingot rate last week jumped another 3.5 points to 64 per cent of capacity. At that level, steel is pouring from the furnaces at the rate of about 1,725,000 net tons weekly.

A significant development last week was announcement by Jones & Laughlin Steel Corp. it was stepping up operations at its Cleveland Works. That plant went down for repairs in February and was scheduled to resume in May. Resumption was deferred because of the business lag. Early this month, though, some men were called back. About 1000 have been engaged the last couple weeks with the cold-rolled sheet mill engaged on rush orders for June shipment.

Under the new schedule, about 10 per cent of the plant's employees will be called back the first week of July, and the force will be gradually built up over the rest of the month, reaching about 75 per cent of its normal 4500.

One of the works' two blast furnaces will be placed in operation July 5. Several days later, open hearth furnace operations will be resumed.

It is indicated that the planned step-up in production is being scheduled in anticipation of improved third quarter business. Present orders, it is understood, indicate about 3400 workmen will be needed until a further pickup in buying is experienced.

May Steel Output Rises

Production of steel ingots in May totaled 6,308,000 net tons, reports the American Iron & Steel Institute. This was the highest monthly output since January. Production was 5,532,991 tons in April and 9,792,-323 in May a year ago.

Output for the first five months this year totals 30,631,848 net tons, vs. 51,192,145 in the corresponding 1957 period.

The institute's index of steelmaking for May stood at 88.7 in terms of the basic index of average production during 1947-49. That compared with 80.4 in April, and 137.6 during May, 1957.

Steel Ingot Production—May, 1958

Period 1958	—OPEN HEARTH— Net tons	Per cent of capacity	—BESSEMER— Net tons	Per cent of capacity	—ELECTRIC— Net tons	Per cent of capacity	—TOTAL— Net tons	Per cent of capacity
January ..	6,085,124	58.6	121,338	35.5	547,440	44.8	6,753,902	56.5
February .	5,252,112	56.0	81,597	26.4	448,614	40.6	5,782,323	53.6
March	5,598,944	53.9	122,317	35.8	533,361	43.6	6,254,622	52.3
1st Qtr. ..	16,936,180	56.2	325,252	32.8	1,529,425	43.1	18,790,857	54.1
*April	4,875,619	48.5	109,433	33.1	547,939	46.3	5,532,991	47.8
†May	5,607,000	54.0	110,000	32.2	591,000	48.3	6,308,000	52.8
1957								
January ..	9,829,691	99.0	294,839	77.1	884,232	86.5	11,008,762	97.1
February .	8,898,671	99.2	227,682	80.4	810,853	87.8	9,987,206	97.6
March	9,442,161	95.1	275,156	71.9	871,754	85.2	10,589,074	93.4
1st Qtr. ..	28,170,526	97.7	847,677	76.3	2,566,839	86.4	31,585,042	96.0
April	8,820,328	91.8	231,731	62.6	762,721	77.1	9,814,780	89.5
May	8,842,707	89.1	201,864	52.8	747,752	73.1	9,792,323	86.4
June	8,498,903	88.4	210,915	57.0	681,584	68.9	9,391,402	85.6
2nd Qtr. ..	26,161,938	89.8	644,510	57.4	2,192,057	73.0	28,998,505	87.2
1st 6 Mo. .	54,332,464	93.7	1,492,187	66.8	4,758,896	79.7	60,583,547	91.5
July	8,086,519	81.4	194,638	50.9	627,575	61.4	8,908,732	78.6
August ...	8,297,172	83.6	204,723	53.5	731,995	71.6	9,233,890	81.5
September..	8,135,139	84.7	185,967	50.2	656,800	66.4	8,977,906	81.8
3rd Qtr. ..	24,518,830	83.2	585,328	51.5	2,016,370	66.4	27,120,528	80.6
9 Mo.	78,851,294	90.2	2,077,515	61.7	6,775,266	75.2	87,704,075	87.9
October ...	8,348,522	84.1	154,577	40.4	694,618	67.9	9,197,717	81.1
November .	7,674,698	79.9	134,709	36.4	583,512	59.0	8,392,919	76.5
December .	6,783,262	68.3	108,237	28.3	528,686	51.7	7,420,285	65.5
4th Qtr. ..	22,806,482	77.4	397,623	35.0	1,806,816	59.5	25,010,921	74.4
2nd 6 Mo..	47,325,312	80.3	982,951	43.3	3,823,186	63.0	52,131,449	77.5
Total	101,657,776	87.0	2,475,138	54.9	8,582,082	71.3	112,714,996	84.5

Note—The percentages of capacity operated are based on annual capacities as of Jan. 1, 1958, as follows: Open hearth 122,321,830 net tons; bessemer 4,027,000 net tons; oxygen process, electric and crucible 14,398,740 net tons. Total for 1958, 140,742,570 net tons. For 1957, the capacity tonnages are: Open hearth 116,912,410 net tons; bessemer 4,505,000 net tons; oxygen process, electric and crucible 12,041,740 net tons. Total for 1957, 133,459,150 net tons.
*Revised. †Preliminary.

DISTRICT INGOT RATES
(Percentage of Capacity Engaged)

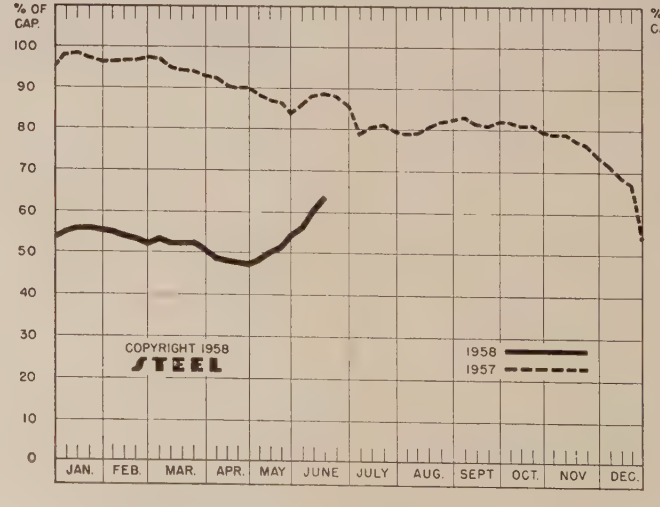
	Week Ended June 15	Change	Same Week 1957	Same Week 1956
Pittsburgh	59.5	+ 0.5*	88	95.5
Chicago	68	+ 0.5*	87.5	99
Mid-Atlantic	60	+ 2	94.5	98
Youngstown	50	+ 1	76.5	95
Wheeling	75	+ 1	83.5	100.5
Cleveland	43	+ 6.5*	89	101
Buffalo	53.5	0	102.5	105
Birmingham	60.5	— 6.5	92.5	23.5
New England	41	+ 1	57	88
Cincinnati	61	+ 1*	88	92.5
St. Louis	95.5	— 1.5	84.5	103
Detroit	65.5	— 2.5*	99	95.5
Western	72	— 2*	99	105
National Rate ..	64	+ 3.5	88.5	97

INGOT PRODUCTION‡

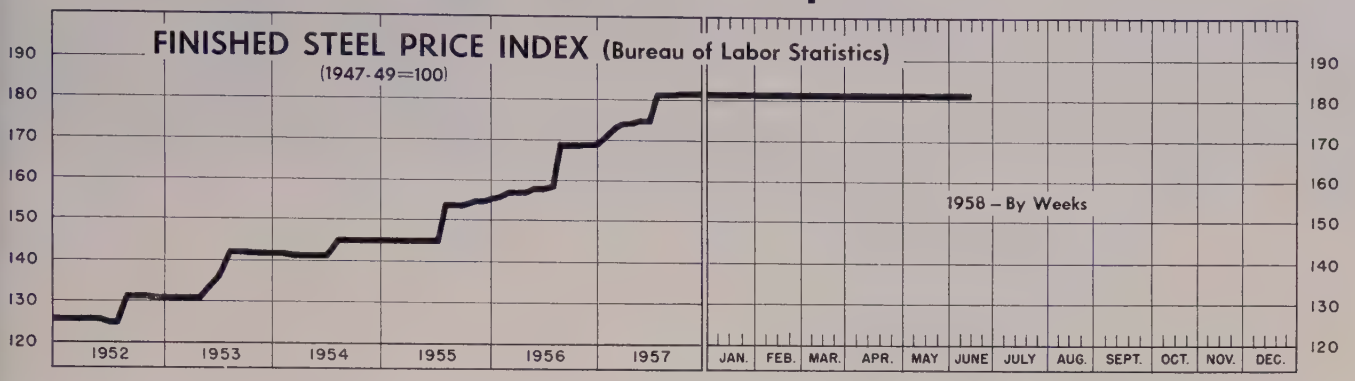
	Week Ended June 15	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	107.3†	104.9	87.9	137.8
NET TONS (In thousands)	1,723†	1,685	1,412	2,214

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,699,173 in 1958; 2,559,490 in 1957; 2,461,893 in 1956.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



June 10, 1958	Week Ago	Month Ago	May Avg	Year Ago
181.6	181.6	181.6	181.6	174.3

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended June 10

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.600	Bars, Reinforcing	6.135
Rails, Light, 40 lb	7.067	Bars, C.F., Carbon	10.360
Tie Plates	6.600	Bars, C.F., Alloy	13.875
Axles, Railway	9.825	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	60.000	Sheets, H.R., Carbon	6.183
Plates, Carbon	6.150	Sheets, C.R., Carbon	7.075
Structural Shapes	5.942	Sheets, Galvanized	8.270
Bars, Tool Steel, Carbon (lb)	0.535	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.650	Sheets, Electrical	12.025
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.355	Strip, C.R., Carbon	9.243
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.850	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.525	Strip, H.R., Carbon	6.085
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	19.814
Bars, H.R., Carbon	6.425	Pipe, Galv., Buttweld (100 ft)	23.264
		Pipe, Line (100 ft)	199.023
		Casing, Oil Well, Carbon (100 ft)	194.499
		Casing, Oil Well, Alloy (100 ft)	304.610
		Tubes, Boiler (100 ft)	49.130
		Tubing, Mechanical, Carbon (100 ft)	24.953
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
		Black Plate, Canmaking Quality (95 lb base box)	7.583
		Wire, Drawn, Carbon	10.225
		Wire, Drawn, Stainless, 430 (lb)	0.653
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	June 11 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	228.59	182.82
Index in cents per lb	6.479	6.479	6.479	6.193	4.953

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$145.42	$145.42	$145.42	$140.24	$111.28
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	64.70	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	64.23	54.66
Malleable Pig Iron, GT	67.27	67.27	67.27	65.77	55.77
Steelmaking Scrap, GT	35.67	36.17	32.83	55.67	39.50

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	June 11 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld. Philadelphia	5.725	5.725	5.725	5.365	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld. Philadelphia	5.545	5.545	5.545	5.31	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.10	5.10	5.10	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.10	5.10	5.10	5.70	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.975-4.225
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.15-7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	5.225-5.475
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.49	6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, 7/32-5/8" Pitts.	6.15	6.15	6.15	5.80	4.425

PIG IRON, Gross Ton

	June 11 1958	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$65.50	$55.50
Basic, Valley	66.00	66.00	66.00	64.50	54.50
Basic, deld., Phila.	70.41	70.41	70.41	68.38	59.25
No. 2 Fdry, NevilleIsland,Pa.	66.50	66.50	66.50	65.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	65.00	55.00
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	68.88	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	65.00	55.00
Malleable, Chicago	66.50	66.50	66.50	65.00	55.00
Ferromanganese, net ton	245.00†	245.00†	245.00†	255.00†	200.00*

†74-76% Mn, Duquesne, Pa. *Etna, Pa.

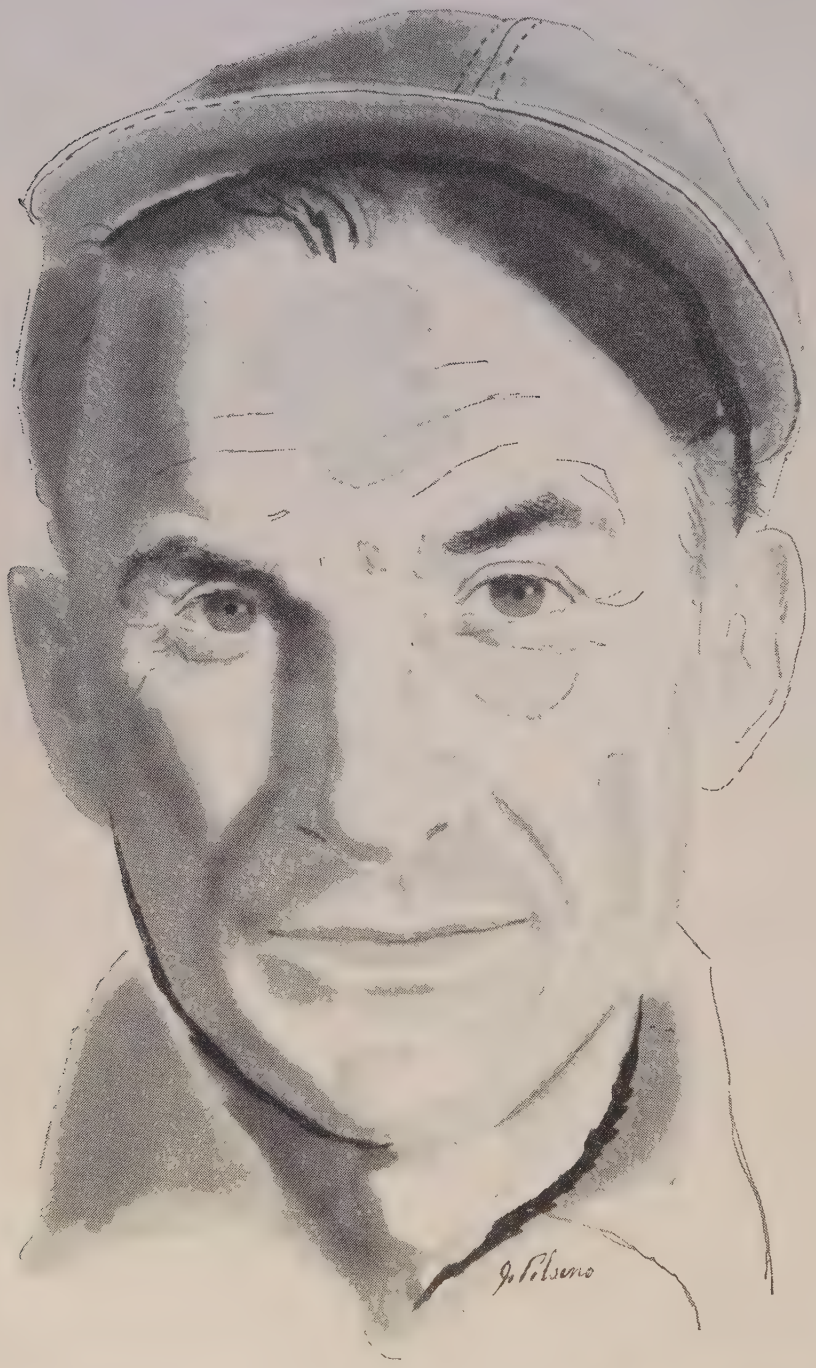
SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$35.50	$36.50	$31.50	$56.50	$39.50
No. 1 Heavy Melt, E. Pa.	34.50	34.50	34.50	56.50	41.50
No. 1 Heavy Melt, Chicago	37.00	37.50	32.50	41.50	37.50
No. 1 Heavy Melt, Valley	36.50	36.50	33.50	54.50	41.50
No. 1 Heavy Melt, Cleve.	33.00	33.00	30.50	51.50	39.00
No. 1 Heavy Melt, Buffalo	26.50	26.50	26.50	46.50	40.75
Rails, Rerolling, Chicago	54.00	56.50	50.50	66.50	47.50
No. 1 Cast, Chicago	41.50	41.50	38.50	46.50	38.00

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.00	17.00

An expert in check-out helped us check up



This test pilot of ours has checked out every new design we've had in the last two years. His business is finding answers to questions. But last week he asked *us* one.

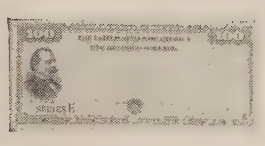
"Why can't we rig it so I can buy U. S. Savings Bonds out of my salary, automatically?" he asked. "I want to save, but I keep forgetting about it."

We told him, of course, that we've had Payroll Savings for years. Within minutes his card was signed and he was brought into the Plan. Then we decided to check up and see how many other people on our staff had never heard about the Plan. There were quite a few.

A telephone call to our State Savings Bond Director was all we needed. He supplied us with the latest booklets, folders and forms. Then he conducted a survey straight through our company and put an application blank in the hands of every single employee.

There wasn't a bit of pressure about this information campaign, but the way our people responded was inspiring. They proved that the average American wants the fine investment security that U. S. Savings Bonds provide.

Today there are more Payroll savers than ever before in peacetime. Your State Director will be happy to help you install a Payroll Savings Plan or build enrollment in one already existing. Look him up in the phone book or write: Savings Bonds Division, U. S. Treasury Dept., Washington, D. C.



STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE

Steel Prices

Mill prices as reported to STEEL, June 11, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill points indicate producing company. Key to producers, page 144; to footnotes, page 146.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$73.50

INGOTS, Alloy (NT)
Detroit S41 .....$77.00
Farrell,Pa. S3 .....77.00
Lowellville, O. S3 ....77.00
Midland,Pa. C18 .....77.00
Munhall,Pa. U5 .....77.00
Sharon,Pa. S3 .....77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ....$77.50
Buffalo R2 .....77.50
Clairton,Pa. U5 .....77.50
Ensley,Ala. T2 .....77.50
Fairfield,Ala. T2 .....77.50
Fontana,Calif. K1 ....88.00
Gary,Ind. U5 .....77.50
Johnstown,Pa. B3 .....77.50
Lackawanna,N.Y. B2 ..77.50
Munhall,Pa. U5 .....77.50
Owensboro,Ky. G8 ....77.50
S.Chicago,Ill. R2, U5..77.50
S. Duquesne,Pa. U5 ...77.50
Sterling,Ill. N15 .....77.50
Youngstown R2 .....77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 .....$96.00
Buffalo R2 .....96.00
Canton,O. R2 .....98.50
Clairton,Pa. U5 .....96.00
Conshohocken,Pa. A3..101.00
Ensley,Ala. T2 .....96.00
Fairfield,Ala. T2 .....96.00
Fontana,Calif. K1 ....105.50
Gary,Ind. U5 .....96.00
Geneva,Utah C11 .....96.00
Houston S5 .....101.00
Johnstown,Pa. B2 .....96.00
Lackawanna,N.Y. B2 ..96.00
Los Angeles B3 .....105.50
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
Owensboro,Ky. G8 ....96.00
Seattle B3 .....109.50
Sharon,Pa. S3 .....96.00
S.Chicago R2, U5, W14.96.00
S.Duquesne,Pa. U5 ...96.00
S.SanFrancisco B3 ..105.50
Warren,O. C17 .....96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ...$114.00
Bridgeport,Conn. C32.114.00
Buffalo R2 .....114.00
Canton,O. R2, T7 ....114.00
Conshohocken,Pa. A3 .121.00
Detroit S41 .....114.00
Economy,Pa. B14 .....114.00
Farrell,Pa. S3 .....114.00
Fontana,Calif. K1 ....135.00
Gary,Ind. U5 .....114.00
Houston S5 .....119.00
Ind.Harbor,Ind. Y1 ..114.00
Johnstown,Pa. B2 .....114.00
Lackawanna,N.Y. B2 .114.00
LosAngeles B3 .....134.00
Lowellville,O. S3 .....114.00
Massillon,O. R2 .....114.00
Midland,Pa. C18 .....114.00
Munhall,Pa. U5 .....114.00
Owesboro,Ky. G8 .....114.00
Sharon,Pa. S3 .....114.00
S.Chicago R2,U5,W14 .114.00
S.Duquesne,Pa. U5 ..114.00
Struthers,O. Y1 .....114.00
Warren,O. C17 .....114.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$117.50
Canton,O. R2 .....120.00
Cleveland R2 .....117.50
Gary,Ind U5 .....117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 ...117.50
Warren,O. C17 .....117.50

SKELP
Aliquippa,Pa. J5 ....5.075
Munhall,Pa. U5 .....4.875
Pittsburgh J5 .....5.075
Warren,O. R2 .....4.875
Youngstown R2, U5 ..4.875

WIRE RODS
AlabamaCity,Ala. R2 ...6.15
Aliquippa,Pa. J5 .....6.15
Alton,Ill. L1 .....6.35
Buffalo W12 .....6.15
Cleveland A7 .....6.15
Donora,Pa. A7 .....6.15
Fairfield,Ala. T2 .....6.15
Houston S5 .....6.40
IndianaHarbor,Ind. Y1 ..6.15
Johnstown,Pa. B2 .....6.15
Joliet,Ill. A7 .....6.15
KansasCity,Mo. S5 ....6.40
Kokomo,Ind. C16 .....6.25
LosAngeles B3 .....6.95
Minnequa,Colo. C10 ....6.40
Monessen,Pa. P7 .....6.15
N.Tonawanda,N.Y. B11 .6.15
Pittsburg,Calif. C11 ....6.95
Portsmouth,O. P12 ....6.15
Roebling,N.J. R5 .....6.25
S.Chicago,Ill. R2 .....6.15
SparrowsPoint,Md. B2..6.25
Sterling,Ill.(1) N15 ....6.15
Sterling,Ill. N15 .....6.25
Struthers,O. Y1 .....6.15
Worcester,Mass. A7 ....6.45

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.275
Atlanta A11 .....5.475
Aliquippa,Pa. J5 ....5.275
Bessemer,Ala. T2 ....5.275
Bethlehem,Pa. B2 ....5.325
Birmingham C15 ....5.275
Clairton,Pa. U5 .....5.275
Fairfield,Ala. T2 .....5.275
Fontana,Calif. K1 ....6.075
Gary,Ind. U5 .....5.275
Geneva,Utah C11 .....5.275
Houston S5 .....5.375
Ind.Harbor,Ind. I-2 ...5.275
Johnstown,Pa. B2 ....5.325
Joliet,Ill. P22 .....5.275
KansasCity,Mo. S5 ....5.375
Lackawanna,N.Y. B2 ...5.325
LosAngeles B3 .....5.975
Minnequa,Colo. C10 ...5.75
Munhall,Pa. U5 .....5.275
Niles,Calif. P1 .....5.925
Phoenixville,Pa. P4 ...5.325
Portland,Oreg. O4 ....6.025
Seattle B3 .....6.025
S.Chicago,Ill. U5, W14 5.275
S.SanFrancisco B3 ....5.925
Sterling,Ill. N15 .....5.275
Torrance,Calif. C11 ...5.975
Weirton,W.Va. W6 ...5.275

Wide Flange
Bethlehem,Pa. B2 ....5.325
Cairton,Pa. U5 .....5.275
Fontana,Calif. K1 ....6.225
IndianaHarbor,Ind. I-2 5.275
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 .....5.275
Phoenixville,Pa. P4 ...5.325
S.Chicago,Ill. U5 .....5.275
Weirton,W.Va. W6 ...5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
Houston S5 .....6.65
KansasCity,Mo. S5 ....6.65
Munhall,Pa. U5 .....6.55
S.Chicago,Ill U5 .....6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 .....7.75
Bessemer,Ala. T2 .....7.75
Bethlehem,Pa. B2 .....7.80
Clairton,Pa. U5 .....7.75
Fairfield,Ala. T2 .....7.75
Fontana,Calif. K1 ....8.55
Gary,Ind. U5 .....7.75
Geneva,Utah C11 .....7.75
Houston S5 .....7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 .....7.80
KansasCity,Mo. S5 ....7.85
Lackawanna,N.Y. B2 ...7.80
LosAngeles B3 .....8.45
Munhall,Pa. U5 .....7.75
Seattle B3 .....8.50
S.Chicago,Ill. U5, W14 ..7.75
S.SanFrancisco B3 ....8.40
Struthers,O. Y1 .....7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....7.80
Lackawanna,N.Y. B2 ..7.80
Munhall,Pa. U5 .....7.75
S.Chicago,Ill. U5 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.325
Lackawanna,N.Y. B2 ..5.325
Munhall,Pa. U5 .....5.275
S.Chicago,Ill. U5 .....5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 ..6.225
Munhall,Pa. U5 .....6.225
S.Chicago,Ill. U5 ....6.225
Weirton,W.Va. W6 ....6.225

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(15) A10 ...5.10
Atlanta A11 .....5.30
Bessemer,Ala. T2 .....5.10
Clairton,Pa. U5 .....5.10
Claymont,Del. C22 ....5.10
Cleveland J5, R2 .....5.20
Coatesville,Pa. L7 ....5.10
Conshohocken,Pa. A3 ..5.10
Ecorse,Mich. G5 .....*5.10*
Fairfield,Ala. T2 .....5.10
Fontana,Calif.(30) K1 ..5.90
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.10
GraniteCity,Ill. G4 .....5.20
Harrisburg,Pa. P4 ....5.10
Houston S5 .....5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Johnstown,Pa. B2 .....5.10
Lackawanna,N.Y. B2 ..5.10
LoneStar,Tex. L6 .....5.20
Mansfield,O. E6 .....5.10
Minnequa,Colo. C10 ....5.95
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Pittsburgh J5 .....5.10
Riverdale,Ill. A1 .....5.10
Seattle B3 .....6.00
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Sterling,Ill. N15 .....5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Youngstown U5, Y1 ....5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....6.75
Fontana,Calif. K1 .....7.55
Geneva,Utah C11 .....6.75
Houston S5 .....6.85
Johnstown,Pa. B2 .....6.75
SparrowsPoint,Md. B2 ..6.75

PLATES, Wrought Iron
Economy,Pa. B14 ....13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.625
Bessemer,Ala. T2 ....7.625
Cairton,Pa. U5 .....7.625
Claymont,Del. C22 ....7.625
Cleveland J5, R2 ....7.625
Coatesville,Pa. L7 ....7.625
Conshohocken,Pa. A3 ..7.625
Economy,Pa. B14 ....7.625
Ecorse,Mich. G5 .....*7.625*
Fairfield,Ala. T2 .....7.625
Farrell,Pa. S3 .....7.625
Fontana,Calif.(30) K1 8.425
Gary,Ind. U5 .....7.625
Geneva,Utah C11 ....7.625
Houston S5 .....7.725
Ind.Harbor,Ind. I-2, Y1.7.625
Johnstown,Pa. B2 .....7.625
Munhall,Pa. U5 .....7.625
Pittsburgh J5 .....7.625
Seattle B3 .....8.525
Sharon,Pa. S3 .....7.625
S.Chicago,Ill. U5, W14 .7.625
SparrowsPoint,Md. B2..7.625
Warren,O. R2 .....7.625
Youngstown U5 .....7.625

PLATES, ALLOY
Aliquippa,Pa. J5 .....7.20
Claymont,Del. C22 ....7.20
Coatesville,Pa. L7 ....7.20
Economy,Pa. B14 .....7.20
Fontana,Calif. K1 .....8.00
Gary,Ind. U5 .....7.20
Houston S5 .....7.30
Ind.Harbor,Ind. Y1 ....7.20
Johnstown,Pa. B2 .....7.20
Lowellville,O. S3 .....7.20
Munhall,Pa. U5 .....7.20
Newport,Ky. A2 .....7.20
Pittsburgh J5 .....7.20
Seattle B3 .....8.10
Sharon,Pa. S3 .....7.20
S.Chicago,Ill. U5, W14..7.20
SparrowsPoint,Md. B2 ..7.20
Youngstown Y1 .....7.20

FLOOR PLATES
Cleveland J5 .....6.175
Conshohocken,Pa. A3 ..6.175
Ind.Harbor,Ind. I-2 ..6.175
Munhall,Pa. U5 .....6.175
S.Chicago,Ill. U5 ....6.175

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.35
Ashland l.c.l.(15) A10..5.85
Cleveland c.l. R2 .....5.85
Warren,O. c.l. R2 .....5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.425
Aliquippa,Pa.(9) J5 ...5.425
Alton,Ill. L1 .....5.625
Atlanta(9) A11 .....5.625
Bessemer,Ala.(9) T2 ..5.425
Birmingham(9) C15 ...5.425
Buffalo(9) R2 .....5.425
Clairton,Pa.(9) U5 ....5.425
Cleveland (9) R2 ....5.425
Ecorse,Mich.(9) G5 ....*5.425*
Emeryville,Calif. J7 ...6.175
Fairfield,Ala.(9) T2 ...5.425
Fairless,Pa.(9) U5 ....5.575
Fontana,Calif.(9) K1 ..6.125
Gary,Ind.(9) U5 .....5.425
Houston(9) S5 .....5.675
Ind.Harbor(9) I-2, Y1..5.425
Johnstown,Pa.(9) B2 ..5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo.(9) S5..6.675
Lackawanna(9) B2 ...5.425
LosAngeles(9) B3 ....6.125
Midland,Pa.(23) C18 ..5.725
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 .....6.125
N.T'wanda,N.Y.(23)B11 5.775
Owensboro,Ky.(9) G8 ..5.425
Pittsburg,Calif.(9) C11.6.125
Pittsburgh(9) J5 ....5.425
Portland,Oreg. O4 ....6.175
Seattle B3, N14 .....6.175
S.Ch'c'go(9)R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5..5.425
S.SanFran.,Calif.(9)B3 6.175
Sterling,Ill.(1)(9) N15..5.425
Sterling,Ill.(9) N15 ....5.525
Struthers,O.(9) Y1 ....5.425
Tonawanda,N.Y. B12 ..5.425
Torrance,Calif.(9) C11 .6.125
Youngstown(9)R2, U5..5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 .....7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.475
Bethlehem,Pa. B2 .....6.475
Bridgeport,Conn. C32 ...6.55
Buffalo R2 .....6.475
Canton,O. R2, T7 ....6.475
Clairton,Pa. U5 .....6.475
Detroit S41 .....6.475
Economy,Pa. B14 .....6.475
Ecorse,Mich. G5 .....*6.475*
Fairless,Pa. C5 .....6.625
Farrell,Pa. S3 .....6.475
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 .....6.475
Houston S5 .....6.725
Ind.Harbor,Ind.I-2, Y1.6.475
Johnstown,Pa. B2 .....6.475
KansasCity,Mo. S5 ....6.725
Lackawanna,N.Y. B2 ..6.475
Lowellville,O. S3 .....6.475
LosAngeles B3 .....7.525
Massillon,O. R2 .....6.475
Midland,Pa. C18 .....6.475
Owensboro,Ky. G8 .....6.475
Pittsburgh J5 .....6.475
Sharon,Pa. S3 .....6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 ...6.475
Struthers,O. Y1 .....6.475
Warren,O. C17 .....6.475
Youngstown U5 .....6.475

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa, Pa. J5 ....7.925
Bessemer,Ala T2 .....7.925
Bethlehem,Pa. B2 ....7.925
Clairton,Pa. U5 .....7.925
Cleveland, R2 .....7.925
Ecorse,Mich. G5 .....*7.925*
Fairfield,Ala. T2 .....7.925
Fontana,Calif. K1 ....8.625
Gary,Ind. U5 .....7.925
Houston S5 .....8.175
Ind.Harbor,Ind. Y1 ...7.925
Johnstown,Pa. B2 .....7.925
KansasCity,Mo. S5 ....8.175
Lackawanna,N.Y. B2 ..7.925
LosAngeles B3 .....8.625
Pittsburgh J5 .....7.925
Seattle B3 .....8.675
S.Chicago,Ill. U5, W14.7.925
S.Duquesne,Pa. U5 ....7.925
S.SanFrancisco B3 ....8.675
Struthers,O. Y1 .....7.925
Youngstown U5 .....7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.575
Houston(9) S5 .....5.675
KansasCity,Mo.(9) S5..5.675
Lackawanna(9) B2 ....5.425
Sterling,Ill. N15 .....5.525
Sterling,Ill.(1) N15 ...5.425
Tonawanda,N.Y. B12 ..5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.425
Atlanta A11 .....5.625
Joliet,Ill. P22 .....5.425
Niles,Calif. P1 .....6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SanFrancisco S7 .....6.275
Seattle B3 .....6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.55
Clairton,Pa. U5 .....6.55
Gary,Ind. U5 .....6.55
KansasCity,Mo. S5 ....6.80
Pittsburgh J5 .....6.55
Youngstown U5 .....6.55

BARS, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ....9.925
BeaverFalls,Pa. M12 ..9.925
Camden,N.J. P13 .....10.10
Chicago W18 .....9.925
Cleveland C20 .....9.925*
Elyria,O. W8 .....9.925
LosAngeles P2, S30..11.40*
Monaca,Pa. S17 .....9.925
Newark,N.J. W18 .....10.10
SpringCity,Pa. K3 .....10.10
Warren,O. C17 .....9.925

*Grade A; add 0.50c for Grade B.

BARS, Cold-finished Carbon
Ambridge,Pa. W18 ....7.30
BeaverFalls,Pa. M12,R2.7.30
Birmingham C15 .....7.90
Buffalo B5 .....7.35
Camden,N.J. P13 .....7.75
Carnegie,Pa. C12 .....7.30
Chicago W18 .....7.30
Cleveland A7, C20 ....7.30
Detroit B5, P17 .....7.50
Detroit S41 .....7.30
Donora,Pa. A7 .....7.30
Elyria,O. W8 .....7.30
FranklinPark,Ill. N5 ...7.30
Gary,Ind. R2 .....7.30
GreenBay,Wis. F7 ....7.30
Hammond,Ind. J5, L2 ..7.30
Hartford,Conn. R2 ....7.80
Harvey,Ill. B5 .....7.30
LosAngeles(49) S30 ....8.75
LosAngeles P2, R2 ....8.75
Mansfield,Mass. B5 ....7.85
Massillon,O. R2, R8 ....7.30
Midland,Pa. C18 .....7.30
Monaca,Pa. S17 .....7.30
Newark,N.J. W18 .....7.75
NewCastle,Pa.(17) B4 ..7.30
Pittsburgh J5 .....7.30
Plymouth,Mich. P5 ....7.55
Putnam,Conn. W18 ....7.85
Readville,Mass. C14 ....7.85
S.Chicago,Ill. W14 ....7.30
SpringCity,Pa. K3 ....7.75
Struthers,O. Y1 .....7.30
Warren,O. C17 .....7.30
Willimantic,Conn. J5 ....7.80
Waukegan,Ill. A7 .....7.30
Youngstown F3, Y1 ....7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19.6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.775
BeaverFalls,Pa. M12,R2 8.775
Bethlehem,Pa. B2 ....8.775
Bridgeport,Conn. C32 8.925
Buffalo B5 .....8.775
Camden,N.J. P13 .....8.95
Canton,O. T7 .....8.775
Carnegie,Pa. C12 .....8.775
Chicago W18 .....8.775
Cleveland A7, C20 ....8.775
Detroit B5, P17 .....8.975
Detroit S41 .....8.775
Donora,Pa. A7 .....8.775
Elyria,O. W8 .....8.775
FranklinPark,Ill. N5 ..8.775
Gary,Ind. R2 .....8.775
GreenBay,Wis. F7 ....8.775
Hammond,Ind. J5, L2..8.775
Hartford,Conn. R2 ....9.075
Harvey,Ill. B5 .....8.775
Lackawanna,N.Y. B2 ..8.775
LosAngeles P2, S30 ...10.75
Mansfield,Mass. B5 ....9.075
Massillon,O. R2, R8 ...8.775
Midland,Pa. C18 .....8.775
Monaca,Pa. S17 .....8.775
Newark,N.J. W18 .....8.95
Plymouth,Mich. P5 ....8.975
S.Chicago,Ill. W14 ....8.775
SpringCity,Pa. K3 .....8.95
Struthers,O. Y1 .....8.775
Warren,O. C17 .....8.775
Waukegan,Ill. A7 .....8.775
Will'mantic,Conn. J5 ..9.075
Worcester,Mass. A7 ...9.075
Youngstown F3, Y1 ...8.775

BARS, Reinforcing (To Fabricators)

AlabamaCity,Ala. R2 ..5.425
Atlanta A11 .....5.425
Birmingham C15 .....5.425
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....*5.675*
Emeryville,Calif. J7 ...6.175
Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 .....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary,Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 ....5.525
Lackawanna,N.Y. B2 ..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ...6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 .....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2..5.425
Sterling,Ill.(1) N15 ...5.425
Sterling,Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ..6.00
Torrance,Calif. C11 ...6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2, U8 .....7.65
Chicago U8 .....6.91
Cleveland U8 .....6.89
Houston S5 .....7.35
Johnstown,Pa. B2 .....7.08
KansasCity,Mo. S5 ....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Philadelphia U8 .....7.38
Pittsburgh J5, U8 .....7.10
SandSprings,Okla. S5 ...7.60
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ....7.08
St.Paul U8 .....7.92
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy(Staybolt)B14 .18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2.5.325
ChicagoHts.(4)(44) I-2.5.425
ChicagoHts.(4) C2 ....5.425
Franklin,Pa.(3) F5 ...5.325
Franklin,Pa.(4) F5 ....5.425
JerseyShore,Pa. (3) J8 ..5.30
Marion,O.(3) P11 ....5.325
Tonawanda(3) B12 ...5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa.(3) S19.5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 .....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....*4.925*
Ecorse,Mich. G5 .....*4.925*
Fairfield,Ala. T2 .....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 ....5.675
Gary,Ind. U5 .....4.925
Geneva,Utah C11 .....5.025
GraniteCity,Ill.(8) G4..5.025
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.925
Lackawanna,N.Y. B2 ..4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ...4.925
Niles,O. M21, S3 .....4.925
Pittsburg,Calif. C11 ...5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 .....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2..4.925
Steubenville,O. W10 ...4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ...4.925
Youngstown U5, Y1 ...4.925

SHEETS, H.R. (19) Ga. & Lighter

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky A2 .....8.10
Youngstown U5, Y1 ....8.10

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 .....7.275
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....*7.275*
Fairfield,Ala. T2 .....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 ....8.025
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna(35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14.7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2..7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ...7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....*6.05*
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ....6.05
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 .....6.15
Ind.Harbor,Ind. I-2, Y1.6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ....7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 .....6.05
SparrowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ....6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville,O. W10 .....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled, High-Strength, Low Alloy

Cleveland J5, R2 .....8.975
Ecorse,Mich. G5 .....*8.975*
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ..10.275
Gary, Ind. U5 .....8.975
IndianaHarbor,Ind. Y1.8.975
Irvin,Pa. U5 .....8.975
Lackawanna(37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint(38) B2..8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1 .....8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.95	7.20
Canton,O. R2	....6.95	7.45
Fairfield T2	.....6.95	7.20
Gary,Ind. U5	....6.95	7.20
GraniteCity,Ill. G4	7.05	...
Ind.Harbor I-2	..6.95	7.20
Irvin,Pa. U5	.....6.95	7.20
Kokomo,Ind. C16	..7.05	...
MartinsFry. W10	6.95	7.20
Pitts.,Calif. C11	..7.70	...
Pittsburgh J5	....6.95	...
SparrowsPt. B2	..6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....7.20

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.60‡
Ashland,Ky. A10 .....6.60†
Canton,O. R2 .....6.60‡
Dover,O. E6 .....6.60†
Fairfield,Ala. T2 .....6.60†
Gary,Ind. U5 .....6.60†
GraniteCity,Ill. G4 ....6.70*
Ind.Harbor,Ind. I-2 ....6.60†
Irvin,Pa. U5 .....6.60†
Kokomo,Ind. C16 .....6.70‡
MartinsFerry,O. W10 ..6.60*
Middletown,O. A10 ....6.60†
Pittsburg,Calif. C11 ...7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ..6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.175

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ..9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.425
Niles,O.(28) R2 .....7.425
Youngstown J5 .....7.275
Weirton,W.Va. W6 ....7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.25
Butler,Pa. A10 (type 2). 9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.625
Cleveland R2 .....6.625
Fairfield,Ala. T2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.725
Ind.Harbor,Ind. I-2, Y1.6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 ....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.65
Ind.Harbor,Ind. I-2 ...8.475
Yorkville,O. W10 .....8.475

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, R2, S3 ..7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.40

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connor Steel Div., H. K. Porter Co. Inc
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D3 Dearborn Div., Sharon Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.925
Allenport,Pa. P7	4.925
Alton,Ill. L1	5.125
Ashland,Ky.(8) A10	4.925
Atlanta A11	4.925
Bessemer,Ala. T2	4.925
Birmingham C15	4.925
Buffalo(27) R2	4.925
Conshohocken,Pa. A3	4.975
Detroit M1	5.025
Ecorse,Mich. G5	*4.925*
Fairfield,Ala. T2	4.925
Fontana,Calif. K1	5.675
Gary,Ind. U5	4.925
Ind.Harbor,Ind. I-2, Y1	4.925
Johnstown,Pa.(25) B2	4.925
Lackaw'na,N.Y.(25) B2	4.925
LosAngeles(25) B3	5.675
Minnequa,Colo. C10	6.025
Riverdale,Ill. A1	4.925
SanFrancisco S7	6.35
Seattle(25) B3	5.925
Seattle N14	6.35
Sharon,Pa. S3	4.925
S.Chicago W14	4.925
S.SanFrancisco(25) B3	5.675
SparrowsPoint,Md. B2	4.925
Sterling,Ill.(1) N15	4.925
Sterling,Ill. N15	5.025
Torrance,Calif. C11	5.675
Warren,O. R2	4.925
Weirton,W.Va. W6	4.925
Youngstown U5	4.925

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.10
Farrell,Pa. S3	8.10
Gary,Ind. U5	8.10
Houston S5	8.35
Ind.Harbor,Ind. Y1	8.10
KansasCity,Mo. S5	8.35
LosAngeles B3	9.30
Lowellville,O. S3	8.10
Newport,Ky. A2	8.10
Sharon,Pa. A2, S3	8.10
S.Chicago,Ill. W14	8.10
Youngstown U5, Y1	8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	7.325
Conshohocken,Pa. A3	7.325
Ecorse,Mich. G5	*7.325*
Fairfield,Ala. T2	7.325
Farrell,Pa. S3	7.325
Gary,Ind. U5	7.325
Ind.Harbor,Ind. I-2, Y1	7.325
Lackawanna,N.Y. B2	7.325
LosAngeles(25) B3	8.075
Seattle(25) B3	8.325
Sharon,Pa. S3	7.325
S.Chicago,Ill. W14	7.325
S.SanFrancisco(25) B3	8.075
SparrowsPoint,Md. B2	7.325
Warren,O. R2	7.325
Weirton,W.Va. W6	7.325
Youngstown U5, Y1	7.325

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.175
Warren,O. R2	5.675

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.15
Baltimore T6	7.15
Boston T6	7.70
Buffalo S40	7.15
Cleveland A7, J5	7.15
Dearborn,Mich. D3	7.25
Detroit D2, M1, P20	7.25
Dover,O. G6	7.15
Ecorse,Mich. G5	*7.15*
Evanston,Ill. M22	7.25
Follansbee,W.Va. F4	7.15
Fontana,Calif. K1	9.00
FranklinPark,Ill. T6	7.25
Ind.Harbor,Ind. Y1	7.15
Indianapolis J5	7.30
LosAngeles J5	9.05
LosAngeles C1	9.20
NewBedford,Mass. R10	7.60
NewBritain,Conn. S15	7.60
NewCastle,Pa. B4, E5	7.15
NewHaven,Conn. D2	7.60
NewKensington,Pa. A6	7.15
Pawtucket,R.I. R3	7.80
Pawtucket,R.I. N8	7.70
Philadelphia P24	7.70
Pittsburgh J5	7.15
Riverdale,Ill. A1	7.25
Rome,N.Y.(32) R6	7.15
Sharon,Pa. S3	7.15
Trenton,N.J.(31) R5	8.60
Wallingford,Conn. W2	7.60
Warren,O. R2, T5	7.15
Weirton,W.Va. W6	7.15
Worcester,Mass. A7	7.70
Youngstown J5, Y1	7.15

STRIP, Cold-Rolled Alloy

Boston T6	15.40
Carnegie,Pa. S18	15.05
Cleveland A7	15.05
Dover,O. G6	15.05
Farrell,Pa. S3	15.05
FranklinPark,Ill. T6	15.05
Harrison,N.J. C18	15.05
Indianapolis J5	15.20
Lowellville,O. S3	15.05
Pawtucket,R.I. N8	15.40
Riverdale,Ill. A1	15.05
Sharon,Pa. S3	15.05
Worcester,Mass. A7	15.35
Youngstown J5	15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.45
Dearborn,Mich. D3	10.60
Dover,O. G6	10.45
Ecorse,Mich. G5	*10.50*
Farrell,Pa. S3	10.50
Ind.Harbor,Ind. Y1	10.65
Sharon,Pa. S3	10.50
Warren,O. R2	10.45
Weirton,W.Va. W6	10.50
Youngstown Y1	10.65

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.90

STRIP, C.R. Electrogalvanized

Cleveland A7	7.15*
Dover,O. G6	7.15*
Evanston,Ill. M22	7.25*
Riverdale,Ill. A1	7.25*
Warren,O. B9, T5	7.15*
Worcester,Mass. A7	7.70*
Youngstown J5	7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	7.275

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Riverdale,Ill. A1	5.50
Sharon,Pa. S3	5.35
Youngstown U5	5.35

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	...	....	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles J5	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	...	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.10	21.95	26.30
Buffalo W12	18.10	....	....
Fostoria,O. S1	18.30	22.15	....
FranklinPark,Ill. T6	18.45	22.30	26.65
Harrison,N.J. C18	18.10	21.95	26.30
New York W3	18.10	21.95	26.30
Palmer,Mass. W12	18.10	....	....
Trenton,N.J. R5	18.10	21.95	26.30
Worcester,Mass. A7, T6	18.10	21.95	26.30
Youngstown J5	18.45	22.30	26.65

SILICON STEEL

H.R. SHEETS(22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	....	11.80	12.90	13.95
Mansfield,O. E6	9.625	11.10	11.80	12.90	13.95
Newport,Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles,O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift,Pa. U5	....	11.10	11.80	12.90	13.95
Warren,O. R2	9.625	11.10	11.80	12.90	....
Zanesville,O. A10	....	11.10	11.80	12.90	13.95

C.R. COILS & CUT LENGTHS (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.35	12.05	13.15	14.20
Brackenridge,Pa. A4	....	....	12.05	13.15	14.20
GraniteCity,Ill. G4	9.725*	10.95*	11.65*	12.75*	....
IndianaHarbor,Ind. I-2	9.625†	10.85*	11.55*	12.65*	....
Mansfield,O. E6	9.625*	11.35	12.05	13.15	14.20
Vandergrift,Pa. U5	9.625*	11.35	12.05	13.15	14.20
Warren,O. R2	9.625*	11.35	12.05	13.15	14.20
Zanesville,O. A10	....	11.35†	12.05	13.15	14.20
					Stator
Vandergrift,Pa. U5	....	....	....	....	7.85

H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.00	15.55	16.05	17.10
Vandergrift,Pa. U5	15.00	15.55	16.05	17.10
Zanesville,O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	17.60	19.20	19.70	20.20	15.25††
Butler,Pa. A10	....	....	....	19.20	19.70	20.20
Vandergrift,Pa. U5	16.60	17.60	19.20	19.70	20.20	15.25**
Warren,O. R2	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower. ††Coils only.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.75	$9.00	$9.40
Fairfield,Ala. T2	8.85	9.10	9.50
Fairless,Pa. U5	8.85	9.10	9.50
Fontana,Calif. K1	9.50	9.75	10.15
Gary,Ind. U5	8.75	9.00	9.40
GraniteCity,Ill. G4	8.85	9.10	9.50
IndianaHarbor,Ind. I-2, Y1	8.75	9.00	9.40
Irvin,Pa. U5	8.75	9.00	9.40
Niles,O. R2	8.75	9.00	9.40
Pittsburg,Calif. C11	9.50	9.75	10.15
SparrowsPoint,Md. B2	8.85	9.10	9.50
Weirton,W.Va. W6	8.75	9.00	9.40
Yorkville,O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	7.725	7.925	....
Niles,O. R2	7.725	7.925	8.125

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.05	$10.30
Fairfield,Ala. T2	10.15	10.40
Fairless,Pa. U5	10.15	10.40
Fontana,Calif. K1	10.80	11.05
Gary,Ind. U5	10.05	10.30
Ind.Harb. Y1	10.05	10.30
Pitts.,Calif. C11	10.80	11.05
Sp.Pt.,Md. B2	10.15	10.40
Weirton,W.Va. W6	10.05	10.30
Yorkville,O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.85
Fairfield,Ala. T2	7.95
Fairless,Pa. U5	7.95
Fontana,Calif. K1	8.60
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. I-2, Y1	7.85
Irvin,Pa. U5	7.85
Niles,O. R2	7.85
Pittsburg,Calif. C11	8.60
SparrowsPoint,Md. B2	7.95
Weirton,W.Va. W6	7.85
Yorkville,O. W10	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.50
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. Y1	7.50
Irvin,Pa. U5	7.50
Yorkville,O. W10	7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$9.70
Irvin,Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary,Ind. U5	$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.65
Aliquippa,Pa. J5	7.65
Alton,Ill. L1	7.85
Atlanta A11	7.65
Bartonville,Ill. K4	7.75
Buffalo W12	7.65
Chicago W13	7.65
Cleveland A7, C20	7.65
Crawfordsville,Ind. M8	7.75
Donora,Pa. A7	7.65
Duluth A7	7.65
Fairfield,Ala. T2	7.65
Fostoria,O.(24) S1	7.75
Houston S5	7.90
Jacksonville,Fla. M8	8.00
Johnstown,Pa. B2	7.65
Joliet,Ill. A7	7.65
KansasCity,Mo. S5	7.90
Kokomo,Ind. C16	7.75
LosAngeles B3	8.60
Minnequa,Colo. C10	7.90
Monessen,Pa. P7, P16	7.65
N.Tonawanda,N.Y. B11	7.65
Palmer,Mass. W12	7.95
Pittsburg,Calif. C11	8.60
Portsmouth,O. P12	7.65
Rankin,Pa. A7	7.65
S.Chicago,Ill. R2	7.65
S.SanFrancisco C10	8.60
SparrowsPoint,Md. B2	7.75
Sterling,Ill.(1) N15	7.65
Sterling,Ill. N15	7.75
Struthers,O. Y1	7.65
Waukegan,Ill. A7	7.65
Worcester,Mass. A7	7.95

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	12.65
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	12.65
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	12.85
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	12.95
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	12.75
Struthers,O. Y1	12.65
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.30
Alton,Ill. L1	9.50
Buffalo W12	9.30
Cleveland A7	9.30
Donora,Pa. A7	9.30
Duluth A7	9.30
Johnstown,Pa. B2	9.30
KansasCity,Mo. S5	9.55
LosAngeles B3	10.25
Minnequa,Colo. C10	9.50
Monessen,Pa. P7, P16	9.30
NewHaven,Conn. A7	9.60
Palmer,Mass. W12	9.60
Pittsburg,Calif. C11	10.25
Portsmouth,O. P12	9.30
Roebling,N.J. R5	9.60
S.Chicago,Ill. R2	9.30
S.SanFrancisco C10	10.25
SparrowsPt.,Md. B2	9.40
Struthers,O. Y1	9.30
Trenton,N.J. A7	9.60
Waukegan,Ill. A7	9.30
Worcester,Mass. A7	9.60

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.30
Alton,Ill. L1	9.50
Bartonville,Ill. K4	9.40
Buffalo W12	9.30
Cleveland A7	9.30
Donora,Pa. A7	9.30
Duluth A7	9.30
Fostoria,O. S1	9.35
Johnstown,Pa. B2	9.30
KansasCity,Mo. S5	9.55
LosAngeles B3	10.25
Milbury,Mass.(12) N6	9.60
Minnequa,Colo. C10	9.50
Monessen,Pa. P7, P16	9.30
Muncie,Ind. I-7	9.50
Palmer,Mass.(12) W12	9.60
Pittsburg,Calif. C11	10.25
Portsmouth,O. P12	9.30
Roebling,N.J. R5	9.60
S.Chicago,Ill. R2	9.30
S.SanFrancisco C10	10.25
SparrowsPt.,Md. B2	9.40
Struthers,O. Y1	9.30
Trenton,N.J. A7	9.60
Waukegan,Ill. A7	9.30
Worcester A7, J4, T6	9.60

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	15.80
Bartonville,Ill. K4	15.70
Buffalo W12	15.60
Chicago W13	15.60
Cleveland A7	15.60
Crawfordsville,Ind. M8	15.70
Fostoria,O. S1	15.60
Houston S5	15.85
Jacksonville,Fla. M8	15.95
Johnstown,Pa. B2	15.60
KansasCity,Mo. S5	15.85
Kokomo,Ind. C16	15.60
Minnequa,Colo. C10	15.85
Monessen,Pa. P16	15.60
Muncie,Ind. I-7	15.80
Palmer,Mass. W12	15.90
S.SanFrancisco C10	16.45
Waukegan,Ill. A7	15.60
Worcester,Mass. A7, T6	15.90

ROPE WIRE (A)

Bartonville,Ill. K4	12.75
Buffalo W12	12.75
Fostoria,O. S1	12.75
Johnstown,Pa. B2	12.75
Monessen,Pa. P7	12.75
Muncie,Ind. I-7	12.95
Palmer,Mass. W12	13.05
Portsmouth,O. P12	12.75
Roebling,N.J. R5	13.05
SparrowsPt.,Md. B2	12.85
Struthers,O. Y1	12.75
Worcester,Mass. J4	13.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4	16.55
Monessen,Pa. P16	16.55
Roebling,N.J. R5	17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	11.65
Baltimore T6	11.95
Boston T6	11.95
Buffalo W12	11.65
Chicago W13	11.75
Cleveland A7	11.65
Crawfordsville,Ind. M8	11.65
Dover,O. G6	11.65
Fostoria,O. S1	11.65
FranklinPark,Ill. T6	11.75
Kokomo,Ind. C16	11.65
Massillon,O. R8	11.65
Milwaukee C23	11.85
Monessen,Pa. P7, P16	11.65
Palmer,Mass. W12	11.95
Pawtucket,R.I. N8	11.95
Philadelphia P24	11.95
Riverdale,Ill. A1	11.75
Rome,N.Y. R6	11.65
Sharon,Pa. S3	11.65
Trenton,N.J. R5	11.95
Warren,O. B9	11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock

	Colo.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$9.10

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Houston S5	180
Jacksonville Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	175
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo.. C10	180
Pittsburgh,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	10.26
Chicago W13	10.26
Crawfordsville,Ind. M8	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. M8	10.36
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill. (37) N15	10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.60
Chicago W13	10.60
Crawfordsville,Ind. M8	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. M8	10.70
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill. (37) N15	10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.65
Chicago W13	10.65
Crawfordsville,Ind. M8	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. M8	10.75
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo.. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.Md. B2	10.75
Sterling,Ill. (37) N15	10.75

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

Birmingham C15	172
ChicagoHts.,Ill. C2, I-2	172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	172
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	174

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa.Pa. J5	190§
Atlanta A11	198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198††

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192††

WIRE (16 gage)	An'ld Galv. Stone	An'ld Galv. Stone
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa. J5	.17.15	18.95
Bartonville K4	..17.25	19.05
Cleveland A7	....17.15	....
Craw'dsville M8	17.25	19.05
Fostoria,O. S1	..17.65	19.20†
Houston S5	....17.40	18.95**
Jacksonville M8	..17.25	19.05
Johnstown B2	..17.15	18.95§
Kan.City,Mo. S5	17.40	....
Kokomo C16	..17.25	18.80†
Minnequa C10	17.40	18.95**
P'lm'r,Mass.W12	17.45	19.00†
Pitts.,Calif. C11	17.50	19.05†
SparrowsPt. B2	17.25	19.05§
Sterling(37)N15	17.25	19.05††
Waukegan A7	..17.15	18.70†
Worcester A7	..17.45	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv. Stone	An'ld Galv. Stone
Ala.City,Ala. R2	8.65	9.20**
Aliquippa J5	....8.65	9.325§
Atlanta(48) A11	8.75	9.425*
Bartonville(48) K4	8.75	9.425
Buffalo W12	....8.65	9.20†
Cleveland A7	....8.65	....
Crawfordsville M8	8.75	9.425
Donora,Pa. A7	..8.65	9.20†
Duluth A7	.....8.65	9.20†
Fairfield T2	.....8.65	9.20†
Houston(48) S5	.8.90	9.45**
Jacks'ville,Fla. M8	8.75	9.425
Johnstown B2(48)	8.65	9.325§
Joliet,Ill. A7	....8.65	9.20†
Kans.City(48) S5	8.90	9.45**
Kokomo C16	....8.75	9.30†
LosAngeles B3	9.60	10.275§
Minnequa C10	..8.90	9.45**
Monessen P7(48)	8.65	9.325§
Palmer,Mass. W12	8.95	9.50†
Pitts.Calif. C11	..9.60	10.15†
Rankin,Pa. A7	..8.65	9.20†
S.Chicago R2	....8.65	9.20**
S.SanFran. C10	..9.60	10.15**
Spar'wsPt.B2(48)	8.75	9.425§
Sterling(48) N15	8.90	9.575††
Sterling(1) (48)	8.80	9.475††
Struthers,O. Y1	..8.65	9.30‡
Worcester,Mass.A7	8.95	9.50†

Based on zinc price of: *13.50. †5c. §10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)
½ in. and smaller:
6 in. and shorter ... 49.0
Longer than 6 in. .. 39.0
⅝ in. thru 1 in.:
6 in. and shorter ... 39.0
Longer than 6 in. .. 35.0
1⅛ in. and larger:
All lengths 35.0
Undersized Body (rolled thread)
½ in. and smaller:
6 in. and shorter ... 49.0

Carriage, Machine, Lag Bolts Hot Galvanized:
½ in. and smaller:
6 in. and shorter ... 29.0
Longer than 6 in. .. 15.0
⅝ in. and larger:
All lengths 12.0

Lag Bolts (all diam.)
6 in. and shorter .. 49.0
Longer than 6 in. .. 39.0

Plow and Tap Bolts
½ in. and smaller by 6 in. and shorter.. 49.0
Larger than ½ in. or longer than 6 in. . 39.0

Blank Bolts 39.0

Step, Elevator, Tire Bolts 49.0

Stove Bolts, Slotted:
⅛ to ¼ in. incl., 3 in. and shorter. 55.0
5/16 to ½ in., inclusive 55.0

NUTS

Reg. & Heavy Square Nuts:
All sizes 55.5

Square Nuts, Reg. & Heavy, Hot Galvanized:
All sizes 41.0

Hex Nuts, Reg. & Heavy, Hot Pressed:
¾ in. and smaller.. 60.5
⅞ in. to 1 in., incl.. 55.5
1⅛ in. to 1½ in., incl. 58.5
1⅝ in. and larger .. 53.5

Hex Nuts, Reg. & Heavy, Cold Punched:
¾ in. and smaller.. 60.5
⅞ in. to 1½ in., incl. 55.5
1⅝ in. and larger .. 53.5

Hex Nuts, All Types, Hot Galvanized:
¾ in. and smaller .. 46.5
⅞ in. to 1 in., incl.. 41.5
1⅛ in. to 1½ in., incl. 46.5

Hex Nuts, Semifinished,

Heavy (Incl. Slotted):
¾ in. and smaller.. 60.5
⅞ in. to 1½ in., incl. 55.5
1⅝ in. and larger .. 53.5

Hex Nuts, Finished (Incl. Slotted and Castellated):
1 in. and smaller .. 63.0
1⅛ in. to 1½ in., incl. 59.0
1⅝ in. and larger.. 53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):
⅝ in. and smaller.. 60.5
¾ in. to 1 in., incl 63.0
1⅛ to 1½ in., incl. 59.0
1⅝ in. and larger... 53.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or fine Thread, Bright:
6 in. and shorter:
⅝ in. and smaller.. 40.0
¾, ⅞, and 1 in. diam. 22.0
Longer than 6 in.:
⅝ in. and smaller.. 8.0
¾, ⅞, and 1 in. diam. .....+ 6.0

High Carbon, Heat Treated:
6 in. and shorter:
⅝ in. and smaller.. 26.0
¾, ⅞, and 1 in. diam. 3.0
Longer than 6 in.:
⅝ in. and smaller..+13.0
¾, ⅞, and 1 in. diam. .....+32.0

Flat Head Capscrews:
¾ in. and smaller..+76.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter.. Net
Longer than 6 in...+23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½ in., larger 12.25
7/16 in. under: List less 19%

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 2000 to 20,000 lb.)

	Strand Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$40.18	$60.25	$76.93	$101.37	$132.06
Cleveland A7	40.18	60.25	76.93	101.37	....
KansasCity,Mo. U3	40.18	60.25	76.93	101.37	132.06
Monessen,Pa. P16	40.18	60.25	76.93	101.37	132.06
NewHaven,Conn. A7..	40.18	60.25	76.93	101.37	132.06
Pittsburg,Calif. C11	....	60.25	76.93	101.37	....
Pueblo,Colo. W12	40.18	60.25	76.93	101.37	132.06
Roebling,N.J. R5	40.18	60.25	76.93	101.37	132.06
St. Louis L8	40.18	60.25	76.93	101.37	132.06
Waukegan,Ill. A7	40.18	60.25	76.93	101.37	132.06

RAILWAY MATERIALS

	Standard		Tee Rails	
Rails	No. 1	No. 2	All No. 2	60-lb Under
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	...
Huntington,W.Va. C15	....	....	....	6.50
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	...
Johnstown,Pa. B2	....	....	...(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	...
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES

Fairfield,Ala. T2	6.60
Gary,Ind U5	6.60
Ind.Harbor,Ind. I-2	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Seattle B3	6.75
Steelton,Pa. B2	6.60
Torrance,Calif. C11	6.75

JOINT BARS

Bessemer, Pa. U5	6.975
Fairfield,Ala. T2	6.975
Ind.Harbor,Ind. I-2	6.975
Joliet,Ill. U5	6.975
Lackawanna,N.Y. B2	6.975
Minnequa,Colo. C10	6.975
Steelton,Pa. B2	6.975

AXLES

Ind.Harbor,Ind. S13	8.775
Johnstown,Pa. B2	8.775

TRACK BOLTS, Untreated

Cleveland R2	14.75
KansasCity,Mo. S5	14.75
Lebanon,Pa. B2	14.75
Minnequa,Colo. C10	14.75
Pittsburgh P14	14.75
Seattle B3	15.25

SCREW SPIKES

Lebanon,Pa. B2	14.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind I-2, Y1	9.75
KansasCity,Mo. S5	9.75
Lebanon,Pa. B2	9.75
Minnequa,Colo. C10	9.75
Pittsburgh J5	9.75
Seattle B3	10.25
S.Chicago,Ill. R2	9.75
Struthers,O. Y1	9.75
Youngstown R2	9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 3 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) 3/8" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.30c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	3.5	+23	+8.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+30	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	40.00	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	46.00	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.00	55.00
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	62.75
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	77.50	....	86.50	91.00	92.75	99.00	104.25
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	80.75	80.75
316L	....	55.50	70.00	76.50	77.00	80.75	84.50	89.25	88.50
317	48.00	60.00	76.75	88.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	55.50	59.75	65.50	65.50
330	....	....	106.75	....	95.25	106.75	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.00	48.25	48.25
420	26.00	33.50	34.25	41.75	39.25	41.25	45.25	52.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	42.00
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steels Inc.; U. S. Steel Corp.; Universal-Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel Co., subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	34.70	37.95	42.25	46.70	39.75
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.50	49.50	54.50	58.25
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.80	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.00	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.10	38.75

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.305	Cr-Hot Work	0.475
Extra Carbon	0.360	W-Cr Hot Work	0.500
Special Carbon	0.475	V-Cr Hot Work	0.520
Oil Hardening	0.475	Hi-Carbon-Cr	0.925

Grade by Analysis (%) W	Cr	V	Co	Mo		$ per lb
20.25	4.25	1.6	12.25	...	.....	4.285
18.25	4.25	1	4.75	...	.....	2.500
18	4	2	9	...	.....	2.870
18	4	2	....	...	.....	1.960
18	4	1	....	...	.....	1.795
9	3.5	..	....	...	.....	1.395
13.5	4	3	....	...	.....	2.060
13.75	3.75	2	5	...	.....	2.440
6.4	4.5	1.9	....	5	.....	1.300
6	4	3	....	6	.....	1.545
1.5	4	1	....	8.5	.....	1.155

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward, Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	68.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield, Ohio, deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
GraniteCity, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity, Ky. P15	$99.00
NiagaraFalls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood, Tenn. T3 (Phos. 0.035% max)	78.50
Troy, N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	8.59§	9.86§	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.68	....	8.76	9.06	11.34#	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	11.07	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	53.50	9.42	9.73	12.90#	15.28	9.63	9.72	11.20
Buffalo	8.25	9.00	11.07	55.98	8.50	8.80	11.00#	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.10	53.00	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.10	52.43	8.54	8.92	11.06	14.86	9.18	8.93	10.21
Cleveland	8.18	9.45	10.20	52.33	8.33	8.69	10.80#	14.74	9.01	8.79	10.11
Dallas	7.50	8.80	....	....	7.65	7.60	11.01	....	9.00	9.45	10.70
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	7.65	8.45	9.70
Detroit	8.43	9.70	10.45	56.50	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95§§	....	8.50	8.75	9.05§§	....	9.00	8.85	10.10
Houston	7.10	8.40	8.45	54.32	7.25	7.20	11.10	13.50	7.25	8.05	9.30
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	8.45	9.40	11.80	57.60	8.90	8.75	12.10	16.10	8.70	8.85	11.00
Memphis, Tenn.	8.55	9.80	....	....	8.60	8.97	11.96#	....	9.01	8.93	10.56
Milwaukee	8.33	9.58	10.23	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.45	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	53.08	9.31	9.57	12.76#	15.09	9.35	9.43	10.66
Norfolk, Va.	8.40	....	....	....	9.10	9.10	12.00	....	9.40	8.85	10.35
Philadelphia	8.00	8.90	9.92	52.69	8.70	8.65	11.51#	15.01	8.50	8.75	9.75**
Pittsburgh	8.18	9.45	10.45	52.00	8.33	8.60	10.80#	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.38	9.55	8.65	14.50	15.95	8.65	8.30	11.50
Richmond, Va.	8.40	....	10.40	....	9.10	9.00	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.71	....	8.84	9.21	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	55.10	9.45	9.70	13.00#	16.00	9.50	9.60	12.00
Seattle	9.95	11.15	12.20	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	9.95	11.15	12.20	57.38	10.00	10.10	14.05	16.35	9.80	9.70	12.10
Washington	8.88	....	....	....	9.36	9.56	10.94	....	9.79	9.26	10.74

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; §—400 to 9999 lb; §—1000 to 1999 lb; §—2000 to 3999 lb; §§—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, Ohio, $138; Cutler, Utah, $165.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., $150; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Clearfield, Orviston, Snow Shoe, Pa., $305; Philadelphia, $310.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Clearfield, Orviston, Snow Shoe, Pa., $345; Philadelphia, $350.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $33-34; Mexican, all rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Ores

Lake Superior Iron Ore

(Prices effective for the 1958 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	27.00

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$11.00-12.00*
Domestic, concentrates f.o.b. milling points	18.00-20.00

*Before duty.

Manganese Ore

Mn 46-48%, Indian (export tax included), $134.40 per long ton unit, c.i.f. U. S. ports, duty for buyer's account: other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$46.00-48.00
48% 2.8:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

48% no ratio	$32.00-34.00
44% no ratio	24.00-25.00

Turkish

48% 3:1	$51.00-55.00

Domestic

Rail nearest seller

18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

50-55%	$2.25-2.40
60-65%	2.60-3.00

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: deld. east of Mississippi River, ocean bags 23,000 lb and over.. F.o.b. Riverton or Camden, N. J., west of Mississippi River.	10.50 9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over	10.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh).	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	

Aluminum: Atomized, 500-lb drum, freight allowed	
Carlots	39.50
Ton lots	41.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	30.30-45.70†
Bronze, 5000-lb lots	45.70-49.80†
Copper:	
Electrolytic	14.75*
Reduced	14.75*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	74.00
Nickel-Silver, 5000-lb lots	47.80-52.60†
Phosphor-Copper, 5000-lb lots	57.80
Copper (atomized) 5000-lb lots	38.30-46.80†
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.07
Stainless Steel, 316	$1.26
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡
Tungsten:	Dollars
Melting grade, 99%	
60 to 200 mesh, nominal;	
1000 lb and over	3.15
Less than 1000 lb	3.30
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.45
Saginaw, Mich., deld.	34.03
Erie, Pa., ovens	30.50
Everett, Mass., ovens:	
New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, Ohio, ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Neville Island (Pittsburgh), Pa., ovens.	29.25
Painesville, Ohio, ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
St. Paul, ovens	29.75
Chicago, deld.	33.29
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.85 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries.)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.53	$5.33	$5.33	$5.73
Bar Size Angles	5.73	5.58	5.58	5.99
Structural Angles	5.73	5.58	5.58	5.99
I-Beams	5.88	5.72	5.72	6.02
Channels	5.88	5.72	5.72	6.02
Plates (basic bessemer)	6.79	6.62	6.62	6.94
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	25.71	25.59	25.59	26.46
Barbed Wire (†)	6.65	6.65	6.65	7.00
Merchant Bars	6.23	6.07	6.07	6.43
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails (§)	8.02	8.02	7.92	8.20

†Per 82 lb. net, reel. §Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg	29.50
Industrial xylene	32.00-34.00
Per ton, bulk, ovens	
Ammonium sulfate	$32.00-34.00

Cents per pound, producing point

Phenol: Grade 1, 17.50; Grade 2-3, 15.50; Grade 4, 17.50; Grade 5, 16.50; Grade 6, 14.50.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton; $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively. (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2% from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C. 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67-71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 61-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.05c per lb of contained Cr. Packed, c.l. 31.65c, ton 33.45c, less ton 34.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 21.25c, per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 27.50c per lb contained Cr, 14.20c per lb contained Si. 0.75" x down, 28.65c per lb contained Cr, 14.20c per lb contained Si. Delivered.

Chromium Metal Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 14.20c per lb of contained Si. Packed c.l. 16.70c, ton lot 18.15c, less ton 19.80c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferroilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 22.00c per lb of Si. Packed, c.l. 23.65c, ton lot 24.95c, less ton 25.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c, for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delievered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅝ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, carload packed in box pallets 19.80c, in bags 20.70c; 3000 lb to c.l. in box pallets 21.00c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l., bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l., bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l., pallets 9.65c; 2000 lb to c.l., bags, 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Ton lots 2" x D, $4 per lb of containd Cb; less ton lots, $4.05 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $3.80 per lb of contained Cb plus Ta, delivered; less ton lot $3.85 (nominal).

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c; less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa. $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

Scrap Suddenly Reverses Trend

Price advance halted at most consuming centers despite continued sharp rise in steel operations. STEEL's composite on the prime grade drops 50 cents to $35.67

Scrap Prices, Page 154

Chicago—Much of the steam is going out of the local scrap market because of an expected drop in steelmaking operations next month. Consumers are buying sparingly, and purchases of three leading steelmaking grades show prices are off slightly from a week ago. More Declines are likely.

Pittsburgh — Although steelmaking operations are at the highest level of the year, much of the push has gone out of the scrap market. There has been no important mill buying, and dealers can't see much point in holding out for higher prices when all signs point to reduced activity during July. One mill reportedly bought small lots of No. 1 heavy melting at $35 and No. 2 bundles at $25. Brokers who paid $40.50 for factory bundles recently can't sell them at a profit.

Philadelphia—Despite recent increases in major steel scrap prices in some inland districts, the local market remains unchanged. In part, the situation is due to lagging export demand. Locally, a part-cargo is being loaded and another is scheduled to depart from this port late in the month. Nothing is in sight for July.

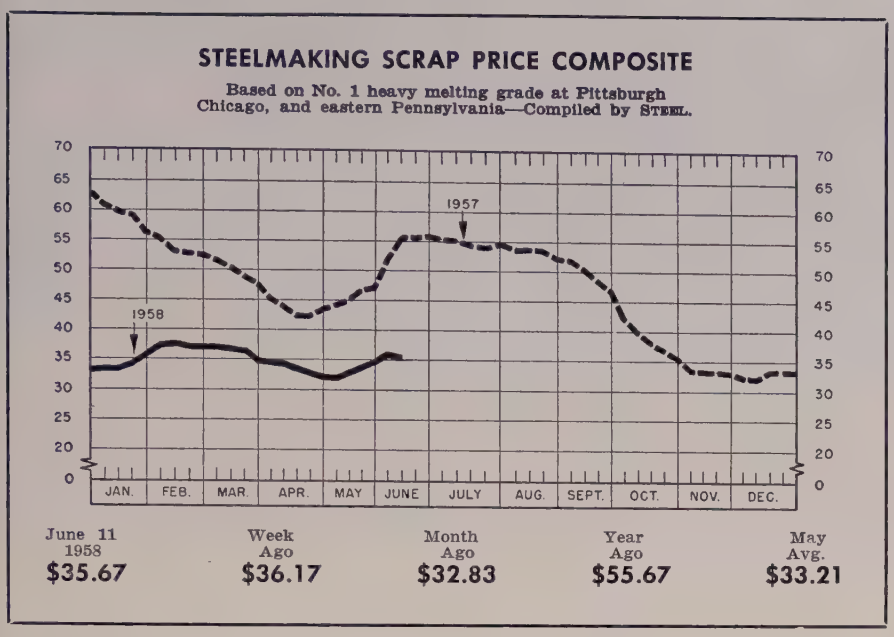
New York — With the market quiet, brokers have reduced their buying prices on heavy melting steel about 50 cents a ton, now quoting $30 for No. 1 heavy melting and No. 1 bundles and $26 for No. 2 heavy melting. They also have eased their prices on low phos structurals and plates to a flat $33. Prices on borings and turnings continue nominal, with not sufficient business going to test the market.

Easing demand is also in exports. Loadings are off, and little new tonnage is in immediate prospect.

Cast iron prices are steady. Stainless scrap, 18-8 sheets, clips, and solids are higher at $140-$145, but other stainless grades are unchanged.

Cleveland — The announcement that blast furnace and open hearth operations at the Cleveland Works of Jones & Laughlin Steel Corp. will be resumed injects a note of strength into the local scrap market. Except for some rolling of cold-rolled sheets the last couple weeks against rush June orders, this mill has been idle since February. Pending a representative purchase, scrap prices are unchanged, but they are largely nominal; not much change is expected until after the vacation season.

Youngstown—Local scrap dealers are watching market developments in other areas closely, hoping they can tell what to expect in prices here. Last sales in this district were at $36 for No. 1 heavy melting. One large buyer indicates it will be out of the market this month. Some dealers attribute the show of



strength of late to the prospect that scrap generation will be off sharply in coming weeks.

Buffalo—The local scrap trade is unsettled by failure of the leading district mill to enter the market for new tonnage this month. Dealers had expected to raise prices $2 to $3 a ton on the strength of this mill's purchase. The mill indicated it would be willing to accept shipments on old orders at the same prices that prevailed in May.

Boston—Borings and turnings are stronger; brokers are paying $1 more a ton. With ingot operations at Worcester about to be stopped, the purchase of steelmaking scrap for that point has ceased. The scrap held at the Worcester Works (American Steel & Wire Div., U. S. Steel Corp.) will be sold in the open market when its open hearths are closed down.

Cincinnati — Consumer buying, which moved steelmaking scrap up $3 a ton a week ago, is about at a standstill. Orders were quickly filled by brokers as the higher buying prices brought out a lot of material. If dealers press scrap onto the market, brokers' prices may slip as much as $2 a ton.

Detroit—Local dealers are less optimistic than they were the last few weeks as low mill requirements and the prospect of July shutdowns in the auto and steel industries contribute a discouraging note. Steel mills have all the scrap they need.

St. Louis—The upward movement of scrap prices here has been checked. No change took place in schedules during the last week. Demand is stronger only in the cast grades. It is not sufficient to up brokers' offering quotations.

Birmingham—District scrap dealers are marking time pending issuance of new price lists by consumers. Buying failed to materialize last week, except for one order for cast at a $1 advance. A large electric furnace interest indicates it will not buy any metal in June. Open hearth consumers also are holding out of the market. Some dealers, though, are asking higher prices in anticipation of an early return of large buyers to the market.

Houston — A light tonnage of heavy melting steel was bought by the Houston mill last week for shipment through July 5. This was its first purchase since April. The prices paid were the same as in April. The mill's operating rate has climbed to 60 per cent of capacity, but it has a substantial scrap inventory and expects an operating slowdown next month. A second Texas mill continues out of the market.

In export trade, signs of a pickup on the Gulf Coast are reported. An undetermined number of cargoes will be loaded for shipment to Japan by the end of September. The Japanese are reported paying $44 a ton c.i.f. Japan. The cargoes will be 40 per cent No. 1 heavy melting, 40 per cent No. 2 heavy melting, and 20 per cent No. 2 bundles.

Los Angeles—Lacking a buying test, scrap prices are unchanged in this market. Quoted lists are nominal. With dealers' yards heavily stocked, collections are off to a new low this year.

Seattle — Local scrapmen anticipate no early improvement in the market situation. Yards are idle. Receipts are light and trading is limited to small tonnages. Mill inventories are substantial. Quoted prices are nominal.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1750 tons, steam powerplant, Orlando Utilities Commission, Orlando, Fla., to the Ingalls Iron Works, Birmingham, from owner direct; Thompson, Street & Singleton Co., Charlotte, N. C., general contractor.

13,500 tons, lower level deck, George Washington Bridge, New York, Port of New York Authority, to Bethlehem Steel Co., Bethlehem, Pa.; bids direct, fabricating and erecting.

1100 tons, galvanized tower steel, to Bethlehem Pacific Coast Steel Corp., Seattle, for Idaho Power Co., Boise, Idaho.

950 tons, two bridges, Ontario, Oreg., to Gate City Steel Inc., Boise, Idaho; Hansen & Parr, Spokane, Wash., general contractor, to the Oregon Highway Commission.

900 tons, food distribution center, Philadelphia, to Bethlehem Fabricators, Bethlehem, Pa.

800 tons, state highway bridges, Decatur, Ala., to the Ingalls Iron Works, Birmingham; Blount Bros. Construction Co., Montgomery, Ala., general contractor.

535 tons, transmission towers, Idaho Power Co. to Gate City Steel Inc., Boise, Idaho.

395 tons, photo products building for Du Pont interests, Parlin, N. J., to Bethlehem Fab-

(*Please turn to Page* 159)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, June 11, 1958. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

June 11	$35.67
June 4	36.17
May Avg.	33.21
June 1957	54.89
June 1953	40.50

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*35.00-36.00*
No. 2 heavy melting	*30.00-31.00*
No. 1 dealer bundles	*35.00-36.00*
No. 2 bundles	*25.00-26.00*
No. 1 busheling	*35.00-36.00*
No. 1 factory bundles	*40.00-41.00*
Machine shop turnings.	14.00-15.00
Mixed borings, turnings	14.00-15.00
Short shovel turnings..	18.00-19.00
Cast iron borings	18.00-19.00
Cut structurals:	
2 ft and under	*39.00-40.00*
3 ft lengths	*37.00-38.00*
Heavy turnings	30.00-31.00
Punchings & plate scrap	*39.00-40.00*
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	40.00-41.00
Stove plate	40.00-41.00
Unstripped motor blocks	23.00-24.00
Clean auto cast	40.00-41.00
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	40.00-41.00
Rails, 2 ft and under..	53.00-54.00
Rails, 18 in. and under	54.00-55.00
Random rails	50.00-51.00
Railroad specialties	44.00-45.00
Angles, splice bars	47.00-48.00
Rails, rerolling	55.00-56.00

Stainless Steel Scrap

18-8 bundles & solids	170.00-175.00
18-8 turnings	95.00-100.00
430 bundles & solids	95.00-100.00
430 turnings	50.00-52.00

CHICAGO

No. 1 hvy melt., indus.	*37.00-39.00*
No. 1 hvy melt., dealer	*35.00-36.00*
No. 2 heavy melting	*31.00-32.00*
No. 1 factory bundles	*39.00-40.00*
No. 1 dealer bundles	*36.00-37.00*
No. 2 bundles	*25.00-26.00*
No. 1 busheling, indus.	*37.00-39.00*
No. 1 busheling, dealer	*35.00-36.00*
Machine shop turnings	*18.00-19.00*
Mixed borings, turnings	*20.00-21.00*
Short shovel turnings	*20.00-21.00*
Cast iron borings	*20.00-21.00*
Cut structurals, 3 ft	*41.00-42.00*
Punchings & plate scrap	*42.00-43.00*

Cast Iron Grades

No. 1 cupola	41.00-42.00
Stove plate	37.00-38.00
Unstripped motor blocks	33.00-34.00
Clean auto cast	46.00-47.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00-41.00*
R.R. malleable	50.00-51.00
Rails, 2 ft and under	*52.00-53.00*
Rails, 18 in. and under	*53.00-54.00*
Angles, splice bars	*48.00-49.00*
Axles	*57.00-58.00*
Rails, rerolling	*53.00-55.00*

Stainless Steel Scrap

18-8 bundles & solids	165.00-170.00
18-8 turnings	90.00-95.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

YOUNGSTOWN

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	22.00-23.00
No. 1 busheling	36.00-37.00
No. 1 bundles	36.00-37.00
No. 2 bundles	21.00-22.00
Machine shop turnings.	9.00-10.00
Short shovel turnings..	13.00-14.00
Cast iron borings	13.00-14.00
Low phos.	34.00-35.00
Electric furnace bundles	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00

CLEVELAND

No. 1 heavy melting	32.50-33.50
No. 2 heavy melting	19.00-20.00
No. 1 factory bundles	34.00-35.00
No. 1 bundles	32.50-33.50
No. 2 bundles	20.00-21.00
No. 1 busheling	32.50-33.50
Machine shop turnings.	7.00-8.00
Short shovel turnings..	11.00-12.00
Mixed borings, turnings	11.00-12.00
Cast iron borings	11.00-12.00
Cut foundry steel	*37.00-38.00*
Cut structurals, plates 2 ft and under	*39.00-40.00*
Low phos, punchings & plate	30.00-31.00
Alloy free, short shovel turnings	16.00-17.00
Electric furnace bundles	33.50-34.50

Cast Iron Grades

No. 1 cupola	42.00-43.00
Charging box cast	33.00-34.00
Heavy breakable cast..	33.00-34.00
Stove plate	43.00-44.00
Unstripped motor blocks	25.00-26.00
Brake shoes	33.00-34.00
Clean auto cast	42.00-43.00
Burnt cast	30.00-31.00
Drop broken machinery	47.00-48.00

Railroad Scrap

R.R. malleable	60.00-61.00
Rails, 2 ft and under..	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Rails, random lengths.	49.00-50.00
Cast steel	44.00-45.00
Railroad specialties	47.00-48.00
Uncut tires	40.00-41.00
Angles, splice bars	46.00-47.00
Rails, rerolling	51.00-52.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	160.00-165.00
18-8 turnings	90.00-95.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	33.00
No. 2 heavy melting	30.00
No. 1 bundles	34.00
No. 2 bundles	23.00
No. 1 busheling	33.00
Machine shop turnings.	16.00†
Short shovel turnings..	18.00†

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	33.00
Heavy breakable cast..	33.00
Unstripped motor blocks	34.00
Clean auto cast	44.00
Stove plate	38.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00
Rails, 18 in. and under	48.00
Rails, random lengths..	45.00
Rails, rerolling	55.00
Angles, splice bars	*44.00*

BIRMINGHAM

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.00-26.00
No. 1 bundles	30.00-31.00
No. 2 bundles	19.00-20.00
No. 1 busheling	30.00-31.00
Cast iron borings	12.00-13.00
Machine shop turnings.	20.00-21.00
Short shovel turnings	21.00-22.00
Bar crops and plates	37.00-38.00
Structurals & plates	36.00-37.00
Electric furnace bundles	34.00-35.00
Electric furnace:	
2 ft and under	33.00-34.00
3 ft and under	32.00-33.00

Cast Iron Grades

No. 1 cupola	*49.00-50.00*
Stove plate	*49.00-50.00*
Unstripped motor blocks	38.00-39.00
Charging box cast	22.00-23.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R heavy melt.	32.00-34.00
Rails, 18 in. and under	47.00-48.00
Rails, rerolling	46.00-47.00
Rails, random lengths	43.00-44.00
Angles, splice bars	39.00-40.00

PHILADELPHIA

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	31.00
No. 1 bundles	34.00-35.00
No. 2 bundles	24.00
No. 1 busheling	34.00-35.00
Electric furnace bundles	36.00
Mixed borings, turnings	16.00†
Short shovel turnings..	18.00
Machine shop turnings.	15.00
Heavy turnings	29.00
Structural & plate	39.00-40.00
Couplers, springs, wheels	43.50
Rail crops, 2 ft & under	56.00-58.00

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast.	40.00
Malleable	58.00-59.00
Drop broken machinery	47.00-48.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*30.00*
No. 2 heavy melting	*26.00*
No. 1 bundles	*30.00*
No. 2 bundles	16.00-17.00
Machine shop turnings	8.00-9.00†
Mixed borings, turnings	9.00-10.00†
Short shovel turnings	11.00-12.00†
Low phos (structurals & plates)	*33.00*

Cast Iron Grades

No. 1 cupola	35.00-36.00
Unstripped motor blocks	24.00-25.00
Heavy breakable	33.00-34.00

Stainless Steel

18-8 sheets, clips, solids	*140.00-145.00*
18-8 borings, turnings.	45.00-50.00
410 sheets, clips, solids	50.00-55.00
430 sheets, clips, solids	60.00-65.00

BUFFALO

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	26.00-27.00
No. 2 bundles	20.00-21.00
No. 1 busheling	26.00-27.00
Mixed borings, turnings	13.00-14.00
Machine shop turnings.	10.00-11.00
Short shovel turnings..	14.00-15.00
Cast iron borings	13.00-14.00
Low phos. structurals and plate, 5 ft and under	31.00-32.00
2 ft and under	35.00-36.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	39.00-40.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths.	45.00-46.00
Rails, 3 ft and under..	51.00-52.00
Railroad specialties	35.00-36.00

CINCINNATI

(Buyers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	28.50-29.50
No. 1 bundles	34.00-35.00
No. 2 bundles	24.00-25.00
No. 1 busheling	34.00-35.00
Machine shop turnings.	11.50-12.50
Mixed borings, turnings	11.50-12.50
Short shovel turnings..	13.50-14.50
Cast iron borings	11.50-12.50
Low phos. 18 in.	39.00-40.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Heavy breakable cast..	32.00-33.00
Charging box cast	32.00-33.00
Drop broken machinery	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00-39.00
Rails, 18 in. and under	52.00-53.00
Rails, random lengths.	43.00-44.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	*32.00*
No. 2 heavy melting	*30.00*
No. 1 bundles	*32.00*
No. 2 bundles	*21.00**
Machine shop turnings	*14.00*
Short shovel turnings	*17.00*
Low phos. plates, structurals	*36.00**

Cast Iron Grades

No. 1 cupola	*38.50*
Heavy breakable	30.00†
Unstripped motor blocks	33.50

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	18.00-19.00
No. 1 bundles	23.00-24.00
No. 2 bundles	14.00-15.00
No. 1 busheling	23.00-24.00
Machine shop turnings	*5.00-6.00*
Mixed borings, turnings	*5.00-6.00*
Short shovel turnings	*7.00-8.00*
No. 1 cast	28.00-29.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	31.00-32.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*27.00-28.00*
No. 2 heavy melting	*19.00-21.00*
No. 1 bundles	*28.00-29.00*
No. 2 bundles	*18.00-19.00*
No. 1 busheling	*27.00-28.00*
Machine shop turnings.	8.00-9.00
Mixed borings, turnings	9.00-10.00
Short shovel turnings..	10.00-11.00
Punchings & plate	31.00-32.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Stove plate	27.00-28.00
Charging box cast	26.00-27.00
Heavy breakable	24.00-25.00
Unstripped motor blocks	15.00-16.00
Clean auto cast	36.00-37.00

SEATTLE

No. 1 heavy melting	27.00†
No. 2 heavy melting	25.00†
No. 1 bundles	21.00†
No. 2 bundles	20.00†
Machine shop turnings	*9.00-10.00†*
Mixed borings, turnings	*9.00-10.00†*
Electric furnace No. 1.	38.00

Cast Iron Grades

No. 1 cupola	31.00
Heavy breakable cast..	28.00
Unstripped motor blocks	23.00
Stove plate (f.o.b. plant)	21.00

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	28.00
No. 2 bundles	20.00
Machine shop turnings	11.00
Shoveling turnings	11.00
Cast iron borings	11.00
Cut structurals and plate 1 ft and under	45.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	41.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	22.00
Machine shop turnings.	15.00
Mixed borings, turnings	15.00
Cast iron borings	15.00
Heavy turnings	15.00
Short shovel turnings..	15.00
Cut structurals, 3 ft.	40.00

Cast Iron Grades

No. 1 cupola	42.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast..	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

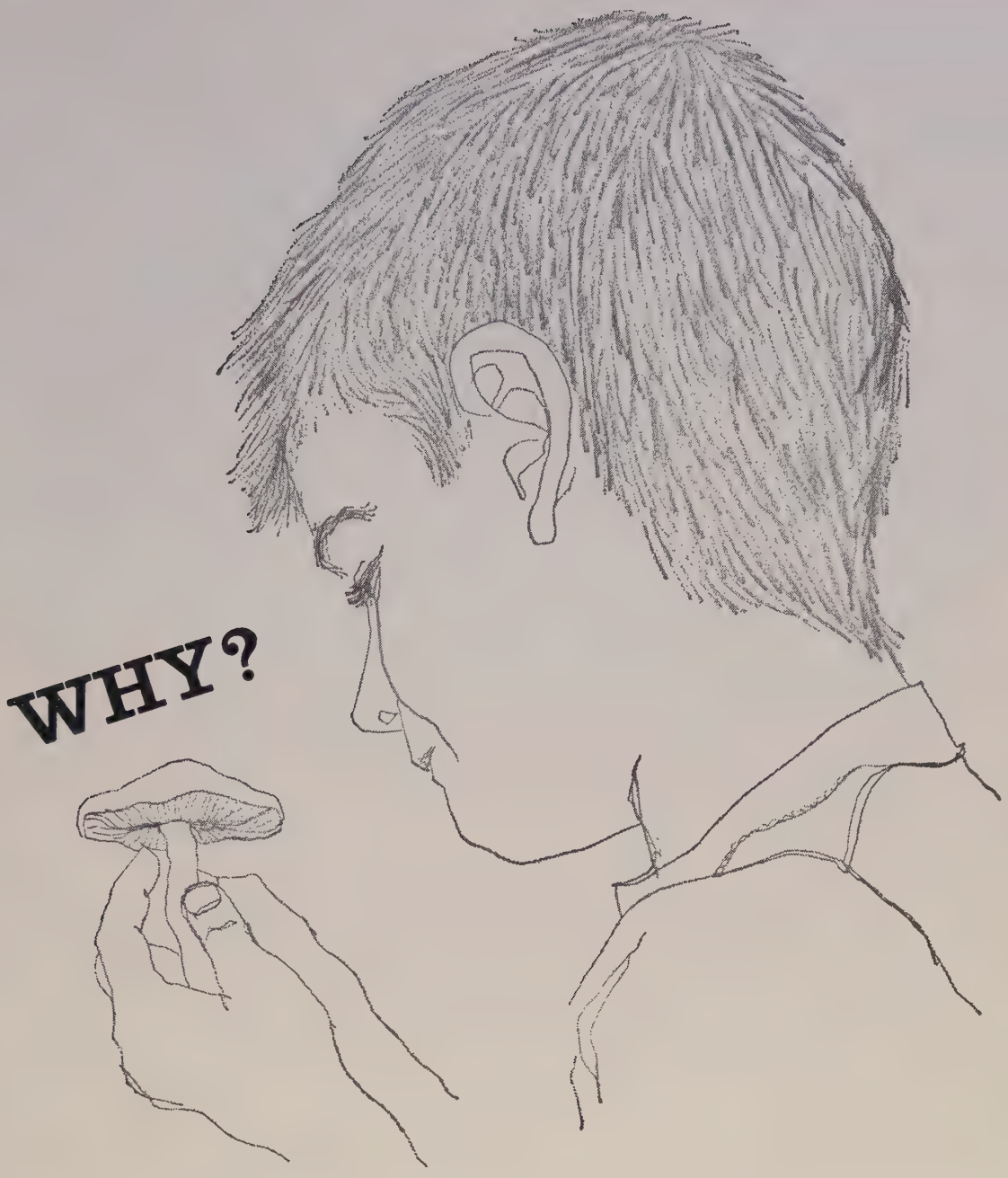
HAMILTON, ONT.

No. 1 heavy melting	30.00
No. 2 heavy melting	26.00
No. 1 bundles	30.00
No. 2 bundles	23.00
Mixed steel scrap	25.00
Mixed borings, turnings	15.00
Busheling, new factory: Prepared	30.00
Unprepared	24.00
Short steel turnings	19.00

Cast Iron Grades‡

No. 1 machinery cast.	45.00-50.00

†Nominal.
‡F.o.b. Hamilton, Ont.



YESTERDAY it wasn't there. Today, he picks it up and wonders: *why did it grow like that?* The miracle of growth! Whether it's a "toadstool" that springs up overnight or a cancer cell that suddenly comes into being, we've a lot to learn about the whole beautiful process of orderly growth . . . and the dreadful, senseless growth that is cancer.

The cancer puzzle is tied up in growth —growth of body cells smaller than the periods on this page.

Scientists, working under grants from the American Cancer Society, are ceaselessly studying cells—normal and cancer cells. And they too are asking: *Why?*

Why do cells suddenly change from normal growth to uncontrolled, disorderly growth? This question can be answered only by the most probing, painstaking and costly research.

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Remember: Cancer can strike anyone. But you can strike back *hard* with your dollars. Send your gift to CANCER in care of your local post office.

AMERICAN CANCER SOCIETY

Copper Price on Rampage

Two price hikes on June 11 pushed custom quotation to 26 cents a pound, 1 cent above producers' level. Seaton stockpile proposal gives market a lift

Nonferrous Metal Prices, Pages 158 & 159

COPPER appears to be headed out of the doldrums that have plagued it for over a year.

Custom smelters, enjoying their best sales spurt this year, put through the eighth hike in three weeks on June 11, bringing the price to 26 cents a pound. Custom smelters are now quoting 1 cent a pound higher than primary producers.

Why—Reasons for the series of hikes appear fourfold: 1. Activity in copper futures on the commodity exchange has been heavy. 2. Dealers have been virtually inactive recently. 3. U. S. consumers have come into the market for a little more metal. 4. Custom smelter scrap intake has dwindled.

Added Frosting—The major motivation behind the latest strength in custom smelter prices is Interior Secretary Fred A. Seaton's June 10 proposal to Congress: As soon as possible, he wants a program to stockpile domestically mined copper. The proposal calls for the purchase of 150,000 tons at a market price not to exceed 27.5 cents a pound. Anticipated cost of the one year program is pegged at $68,730,000.

This program would replace Seaton's earlier proposal to include copper in the controversial five-year mineral stabilization program (see STEEL, June 2, p. 128) which has run into strong opposition from the industry. It appears that a stockpile program would have the backing of the copper industry and Congressional leaders.

Here's Why—A stockpile would siphon much of the excess metal from the market and be cheaper than the mineral program. It would eliminate the objectionable features of federal control over production. The taxpayer would get something for his money.

Metalmen report there may be a shortage of copper at the custom smelter level soon. That means the custom price will probably rise even higher.

What Next?—The big question: What will primary producers do? Trade sources say a hike is possible—probably to 27 or 27.5 cents a pound. Certainly, the price spread that exists and the latest Seaton proposal favor an increase. Other plus signs in the market: 1. Sales have picked up a little. 2. A 1.7 cent a pound copper tariff automatically comes on July 1 unless Congress suspends it. 3. The London Metal Exchange has showed strength lately.

Expansion Goes On

Nonferrous companies will continue to spend at a high level for expansion projects in 1958, although the total will be below the 1957 level.

Only a few companies say the recession has brought a definite curtailment in plans. Most report that reduced expenditures this year are the result of long range programs coming to a close. But you can expect a sharp dropoff in outlays to increase production facilities next year.

Copper — Big Three producers (Kennecott, Anaconda, Phelps Dodge) will spend about $130 million in the U. S. this year, compared with $134 million in 1957. They see 1959 expenditures at around $70 million to $80 million.

Aluminum — Major aluminum companies (Alcoa, Reynolds, Kaiser) say original plans for 1958 called for around $245 million to be spent. The figure is now pegged at closer to $253 million, but the revision indicates an updating of expenditure schedules rather than an increase in planned expansion. Last year, the industry spent over $510 million. In 1959, the figure should drop to about $140 million.

The Canadian producer, Aluminium Ltd., plans to spend an estimated $125 million this year ($200 million was originally earmarked), mainly for bauxite exploration and expansion of hydroelectric power. This is 33 per cent under last year's figure. Combined expenditures for 1959 and 1960 are pegged at around $125 million.

Lead, Zinc—American Smelting & Refining Co. is carrying through with plans to invest $25 million in expansion this year. It's a 40 per cent reduction from 1957 expenditures (due to the completion of major projects last year).

Another lead-zinc producer has increased expansion funds 20 per cent over 1957's. Expenditures are expected to be even greater in 1959 and 1960.

Nickel—International Nickel Co. Inc had capital expenditures of $43,921,000 in 1957. This year they will hit between $60 million and $70 million. Much of the 1958 money will go into the $115-million Thompson, Man., facility which will add 75 million lb yearly to Inco's capacity when it goes into operation in 1960.

NONFERROUS PRICE RECORD

	Price June 11	Last Change	Previous Price	May Avg	Apr. Avg	June, 1957 Avg
Aluminum	24.00	Apr. 1, 1958	26.00	24.000	24.000	27.100
Copper	25.00–26.00	June 11, 1958	25.00–25.50	24.433	24.323	30.250
Lead	10.80	June 3, 1958	11.80	11.512	11.800	14.120
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	94.75	June 11, 1958	94.875	94.510	93.021	98.080
Zinc	10.00	July 1, 1957	10.50	10.000	10.000	10.840

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 24.00; ingots, 26.10, 30,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 27.90; No. 43, 27.70; No. 195, 28.70; No. 214, 29.50; No. 356, 27.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 23.50-24.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per ton, ton lots.

Cadmium: Sticks and bars, $1.55 per lb deld.

Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100 lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $55-90 per lb, nom.

Copper: Electrolytic, 25.00 deld.; custom smelters, 26.00; lake, 25.00 deld.; fire refined, 24.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-80 nom. per troy oz.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, 50-100 lb, cups or ingots, $12; rod, $15; shot or wire, $16. 100-500 lb, cups or ingots, $10.50; rod, $14; shot or wire $15, f.o.b. Minneapolis.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. thick, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $228-230 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty, New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $70-100 per troy oz nom.

Palladium: $19-21 per troy oz.

Platinum: $64-70 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market 88.625 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 94.75.

Titanium: Sponge, 99.3 + % grade A-1 ductile (0.3% Fe max.), 2.05; grade A-2 (0.5% Fe max.), $1.85 per lb.

Tungsten: Powder, 98.8%, carbon reduced. 1000-lb lots, $3.15 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.85.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 11.00; special high grade, 11.25 deld. Diecasting alloy ingot No. 3, 13.75; No. 2, 14.75; No. 5, 14.25 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 24.00-24.50; No. 12 foundry alloy (No. 2 grade), 21.25-21.50; 5% silicon alloy, 0.60 Cu max., 24.00-24.25; 13 alloy 0.60 Cu max., 24.00-24.25; 195 alloy, 24.25-25.50; 108 alloy, 21.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.25; grade 3, 20.00; grade 4, 17.25.

Brass Ingot: Red brass, No. 115, 27.00; tin bronze, No. 225, 36.00; No. 245, 30.75; high-leaded tin bronze, No. 305, 31.25; No. 1 yellow, No. 405, 22.75; manganese bronze, No. 421, 24.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.80, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.78, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 30.355; l.c.l., 30.98. Weatherproof, 30,000-lb lots, 32.53; l.c.l., 33.28. Magnet wire deld., 38.43, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $8.50-15.95; sheared mill plate, $6.00-9.50; wire, $6.50-11.00; forging billets, $4.10-4.35; hot-rolled and forged bars, $5.25-6.35.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, $24.00; plate, $12.50-19.20; H.R. strip, $12.50-22.90; $11.00-17.40.

ZIRCONIUM

C.R. strip, $15.90-31.25; forged or H.R. bars, ribbon zinc in coils, 20.50; plates, 19.00.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strips, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003, and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.136	41.10-45.60	.....
0.135-0.096	41.60-46.70	.....
0.125-0.096	.....	38.50-39.10
0.095-0.077	42.30-48.50	38.60-39.30
0.076-0.061	42.90-50.80	38.80-40.00
0.060-0.048	43.60-53.10	39.40-41.10
0.047-0.038	44.20-55.90	39.90-32.50
0.037-0.030	44.60-60.90	40.30-44.30
0.029-0.024	45.20-52.70	40.60-45.00
0.023-0.019	46.20-56.10	41.70-43.40
0.018-0.017	47.00-53.40	42.30-44.00
0.016-0.015	47.90-54.30	43.10-44.80
0.014	48.90	44.10-45.80
0.013-0.012	50.10	44.80
0.011	51.10	46.00
0.010-0.0095	52.60	47.40
0.009-0.0085	53.90	48.90
0.008-0.0075	55.50	50.10
0.007	57.00	51.60
0.006	58.60	53.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	41.70	46.50
5050-F	42.80	47.60
3004-F	43.80	49.50
5052-F	44.40	50.20
6061-T6	44.90	51.00
2024-T4	48.60	55.40
7075-T6*	56.40	64.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	76.20	73.20	....	....
0.156	64.20	61.40	....	....
0.172	....	61.40	....	....
0.188	64.20	61.40	....	79.60
0.203	64.20	61.40	....	...
0.219-0.234	61.00	59.50	....	....
0.250	61.00	59.50	88.40	75.90
0.266-0.281	61.00	59.50	....	....
0.313	61.00	59.50	81.40	72.20
0.344	60.50	....	81.40	....
Cold-Finished				
0.375-0.547	60.50	59.30	72.80	67.80
0.563-0.688	60.50	59.30	69.10	63.50
0.719	....	57.70	....	....
0.750-1.000	59.00	57.70	62.90	59.70
1.063	59.00	57.70	....	57.60
1.250-1.500	56.60	55.40	60.80	57.60
Rolled				
1.563	55.00	53.70	....	....
1.625-2.000	54.30	52.90	59.60	55.50
2.063	....	51.40	....	....
2.125-2.500	52.80	51.40	....	55.50
2.500-3.000	51.20	49.70	....	55.50
3.250-3.375	....	49.70	....	....

Forging Stock: Round, Class 1, random lengths, diam. 0.688-8 in., "F" temper: 2014, 41.50-54.30; 6061, 40.90-54.30; 7075, 42.90-56.30; 7079, 43.40-56.80.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$18.60	2	$ 57.40
1	29.35	4	157.60
1¼	39.75	6	282.95
1½	47.50	8	425.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	58.60-62.80
12-14	45.70-47.20	59.30-63.80
15-17	45.90-47.90	60.50-65.50
18-20	46.50-48.30	62.50-68.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, .25-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.13b	45.36c	....	48.32	21.000	21.000	20.250
Yellow Brass	42.69	29.53d	43.23	45.60	16.125	15.875	14.500
Low Brass, 80%	44.90	44.84	45.44	47.71	17.875	17.625	17.125
Red Brass, 85%	45.67	45.61	46.21	48.48	18.625	18.375	17.875
Com. Bronze, 90%	46.98	46.92	47.52	49.54	19.250	19.000	18.500
Manganese Bronze	50.81	44.91	55.44	....	14.875	14.625	14.125
Muntz Metal	45.19	41.00	....	....	15.125	14.875	14.375
Naval Brass	47.07	41.38	54.13	50.48	14.875	14.625	14.125
Silicon Bronze	52.84	52.03	52.88	54.77	20.625	20.375	19.625
Nickel Silver, 10%	57.93	60.26	60.26	....	21.125	20.875	10.562
Phos. Bronze, A-5%	67.17	67.67	67.67	68.85	21.875	21.625	20.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, or any or all kinds of scrap, add 1 cent per lb.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Copper and Brass: No. 1 heavy copper and wire, 19.00-19.50; No. 2 heavy copper and wire, 17.50-18.00; light copper, 15.50-16.00; No. 1 composition red brass, 16.00-16.50; No. 1 composition turnings, 15.00-15.50; new brass clippings, 13.50-14.00; light brass, 9.50-10.00; heavy yellow brass, 11.00-11.50; new brass rod ends, 11.50--12.00; auto radiators, unsweated, 12.00-12.50; cocks and faucets, 13.00-13.50; brass pipe, 13.00-13.50.

Lead: Heavy, 6.75-7.00; battery plates, 2.75-3.00; linotype and stereotype, 8.75-9.25; electrotype, 8.00-8.50; mixed babbitt, 9.25-9.75.

Monel: Clippings, 28.00-29.00; old sheets, 25.00-26.00; turnings, 20.00-23.00; rods, 28.00-29.00.

Nickel: Sheets and clips, 42.00-45.00; rolled anodes, 42.00-45.00; turnings, 37.00-40.00; rod ends, 42.00-45.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

Aluminum: Old castings and sheets, 9.50-10.00; clean borings and turnings 6.00-6.50; segregated low copper clips 13.00-13.50; segregated high copper clips, 12.00-12.50; mixed low copper clips, 13.00-14.00; mixed high copper clips, 11.00-11.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 9.00-9.50; clean borings and turnings, 8.00-8.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.50-13.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 9.00-9.50; clean borings and turnings, 8.00-8.50; segregated low copper clips, 12.50-13.00; segregated high copper clips, 11.00-11.50; mixed low copper clips, 11.50-12.00; mixed high copper clips, 10.50-11.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 51.00; light scrap, 46.00; turnings and borings, 31.00.

Copper and Brass: No. 1 heavy copper and wire, 21.50; No. 2 heavy copper and wire, 20.50; light copper, 18.25; refinery brass (60% copper per dry copper content, 19.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 21.50; No. 2 heavy copper and wire, 20.50; light copper, 18.25; No. 1 composition borings, 18.50; No. 1 composition solids, 19.00; heavy yellow brass solids, 13.00; yellow brass turnings, 12.00; radiators, 15.00.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70.

Copper: Flat-rolled, 41.79; oval, 40.00, 5000-10,000 lb; electrodeposited, 35.25, 2000-5000 lb lots; cast, 37.75, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 113.50; 200-499 lb, 112.00; 500-999 lb, 111.50; 1000 lb or more, 111.00.

Zinc: Balls, 16.00; flat tops, 16.00; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.

Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 200 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30; f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 68.40; 300-900 lb, 66.40; 1000-19,900 lb, 64.40.

Copper Sulphate: 100-1900 lb, 13.70; 2000-5900 lb, 11.70; 6000-11,900 lb, 11.45; 12,000-22,900 lb, 11.20; 23,000 lb or more, 10.70.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400-999 lb, 43.50; 10,000 lb or more, 40.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.90; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 75.80; 100-600 lb, 66.80; 700-1900 lb, 64.00; 2000-9900 lb, 62.20; 10,000 lb or more, 60.80.

Stannous Chloride (anhydrous): Less than 25 lb, 165.30; 25 lb, 130.30; 100 lb, 115.30; 400 lb, 112.90; 5200-19,600 lb, 100.70; 20,000 lb or more, 88.50.

Stannous Sulphate: Less than 50 lb, 128.10; 50 lb, 98.10; 100-1900 lb, 96.10; 2000 lb or more, 94.10.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(Concluded from Page 153)

ricators, Bethlehem, Pa.

297 tons, South Yamhill River bridge, Eugene, Oreg., to Gate City Steel Inc., Boise, Idaho; Hamilton & Thomas, Eugene, general contractor.

196 tons, diatomaceous earth plant, Lovelock, Nev., for Kaiser Engineers, to Gate City Steel Inc., Boise, Idaho.

145 tons, state highway bridge, Augusta, Maine, to Bancroft & Martin Rolling Mills Co., South Portland, Maine; Wyman & Simpson Inc., Augusta, general contractor; 125 tons, steel H piles, Bethlehem Steel Co., Bethlehem, Pa., and 75 tons, reinforcing bars, Bancroft & Martin Rolling Mills Co.

120 tons, school addition, Marysville, Wash., to Pointer-Willamette Co. Inc., Edmonds, Wash.; Brazier Construction Co., Seattle, general contractor.

110 tons, extrusion coating plant, Du Pont interests, Parlin, N. J., to Bethlehem Fabricators, Bethlehem, Pa.

STRUCTURAL STEEL PENDING

3300 tons, Broadway Bridge, Harlem River,

CLASSIFIED

Help Wanted

PROCESS METALLURGIST

Exceptional opportunity available for Metallurgical Engineer with administrative experience in development and production of Flat Rolled Electrical Steels. Send resume of education, experience and availability to Box No. 666, STEEL, Penton Bldg., Cleveland 13, Ohio.

TUBE MILL FOREMAN

Experienced in the operations of electric weld steel tubing mills. Steady job with well established company. Replies confidential. Write Box 669, STEEL, Penton Bldg., Cleveland 13, Ohio.

MACHINE SHOP AND FOUNDRY

For Sale, located just outside Memphis, Tennessee, on approximately 9.5 acre tract, R.R. sidings, approximately 42,000 sq. ft. floor space, replacement value over $400,000.

Can sell all equipment or realty separately.

John J. Howard, Jr.
Trustee in Bankruptcy
1325 Exchange Bldg. Memphis 3, Tenn.

New York; Mascalli Construction Co., low on the general contract.

2200 tons, state highway bridges, Oneida County, New York; S. J. Groves & Co., Syracuse, N. Y., low on general contract.

750 tons, sheet steel piling; bids in to the U. S. Engineer, Chicago.

445 tons, two I-beam bridges, Augusta, Maine; bids June 18, Augusta.

300 tons, Idaho State bridge, Cassia and Minidoka Counties; general contract to W. R. Cahoon Construction Co., Pocatello, Idaho, low at $435,811.

300 tons, power plant and pump pit, Arco Testing Station; bids to Atomic Energy Commission, Idaho Falls, Idaho, June 13.

REINFORCING BARS . . .

REINFORCING BARS PLACED

750 tons, depot operations building, Olmstead AFB, Middletown, Pa., to Brocker Mfg. Co., York, Pa., Piracci Construction Co., Baltimore, general contractor; fabricated structural steel to Vulcan Rail & Construction Co., Baltimore.

700 tons, powerplant, Orlando Utilities Commission, Orlando, Fla., to Florida Steel Products Inc., Orlando; Thompson, Street & Singleton Co., Charlotte, N. C., general contractor.

450 tons, municipal incinerator, Philadelphia, to U. S. Steel Supply Div., U. S. Steel Corp., Pittsburgh.

425 tons, state highway structures, Decatur, Ala., to Southern Steel Products Inc., Birmingham; Blount Bros. Construction Co., Montgomery, Ala., general contractor.

415 tons, science center (second section) University of Massachusetts, Amherst, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Columbia Contracting Co., Malden, Mass., general contractor.

100 tons, addition to Cooper Hospital, Camden, N. J., to Concrete Steel Co., Philadelphia; 670 tons of structural steel also required for this project went to Robinson Steel Co., recently noted.

REINFORCING BARS PENDING

1500 tons, 21-story office building, garage, and post office, Seattle; Morrison-Knudsen Co. Inc. and Lloyd W. Johnson, Seattle, joint low at $6,782,000 to University Properties.

1500 tons, deep sea terminal, Anchorage, Alaska; DeLong Corp., Anchorage, low at $5,729,869 to the city of Anchorage.

815 tons, including 490 tons of highway mesh and bridges, Erie Thruway section, North East Township, Pa.; bids June 27, Harrisburg, Pa.; also alternate estimates on four bridge superstructures.

735 tons, including 545 tons of highway mesh, pavement and bridge structures, Erie Thruway section, McKean-Summit, Pa.; bids June 27, Harrisburg, Pa.; also, alternate estimates on six bridge superstructures.

700 tons, Seattle Main Library, Lloyd W. Johnson and Morrison-Knudsen Co. Inc., low at $2,825,000 on joint bid.

495 tons, including 445 tons of highway mesh, pavement, New Milford-Great Bend townships, Pa.; bids June 27, Harrisburg, Pa.

470 tons, final phase Amazon Creek flood control, Eugene, Oreg.; bids to U. S. Engineer, Portland, Oreg., June 24.

275 tons, 50 ft lengths, U. S. Army Engineer, San Francisco.

225 tons, also 60 tons of shapes, Emigrant Dam, Rogue River project, Oregon; R. A. Heintz Construction Co., Portland, Oreg., low at $2,635,493 to Bureau of Reclamation, Camp White, Oreg.

PLATES . . .

PLATES PENDING

100 tons, four 25,000 gallon underground tanks fuel storage, Bradley Field, Windsor Locks, Conn.; bids to U. S. Engineer, Boston.

100 tons, grade 2, 1 in., Watertown Arsenal, Watertown, Mass.

RAILS, CARS . . .

RAILROAD CARS PENDING

Contracting officer, George AFB, California; 110 tons, 90 lb rail; bids in.

General Services Administration, Seattle, 50 fifty-ton flatcars; bids June 20.

Advertising Index

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Classified Advertising, Page 159

for machine gas cutting with natural gas at low pressure

3 NEW AIRCO TORCHES!

Also suitable for city gas, propane, and liquefied petroleum gases under pressure

with these outstanding features:—

- Simplified Ease-on oxygen valve permits fast or slow opening.
- New type tip design permits tip nut to be tightened by hand.
- Mixing of fuel gas and preheat oxygen within the torch.
- Operation without booster.
- 1⅜" barrel that fits all AIRCO torch holders.
- Demountable handle that permits rack to be used in any of four positions.
- Seven straight bore type tips cut steel up to 16" thick.
- Eight divergent type tips cut steel up to 8" thick.

Style	Overall length	Type	Type Airco equipment to be used with
2540 2550	13" 14"	2 hose 3 hose	Radiagraph, Camograph Monograph, Pipe Cutting and Beveling Machines
2560	25½"	3 hose	Travograph, Oxygraph, Duograph

Complete information is now available on these new Airco Natural Gas Torches — data sheets, cutting charts, operating manual. Look in the yellow pages of the phone book under "Welding Equipment" for the Airco office or Airco Authorized Dealer nearest you—or write Airco direct.

AIRCO®

Offices and dealers in most principal cities

AIR REDUCTION SALES COMPANY

A division of Air Reduction Company, Incorporated
150 East 42nd Street, New York 17, N. Y.

On the west coast —
Air Reduction Pacific Company

Internationally —
Airco Company International

In Cuba —
Cuban Air Products Corporation

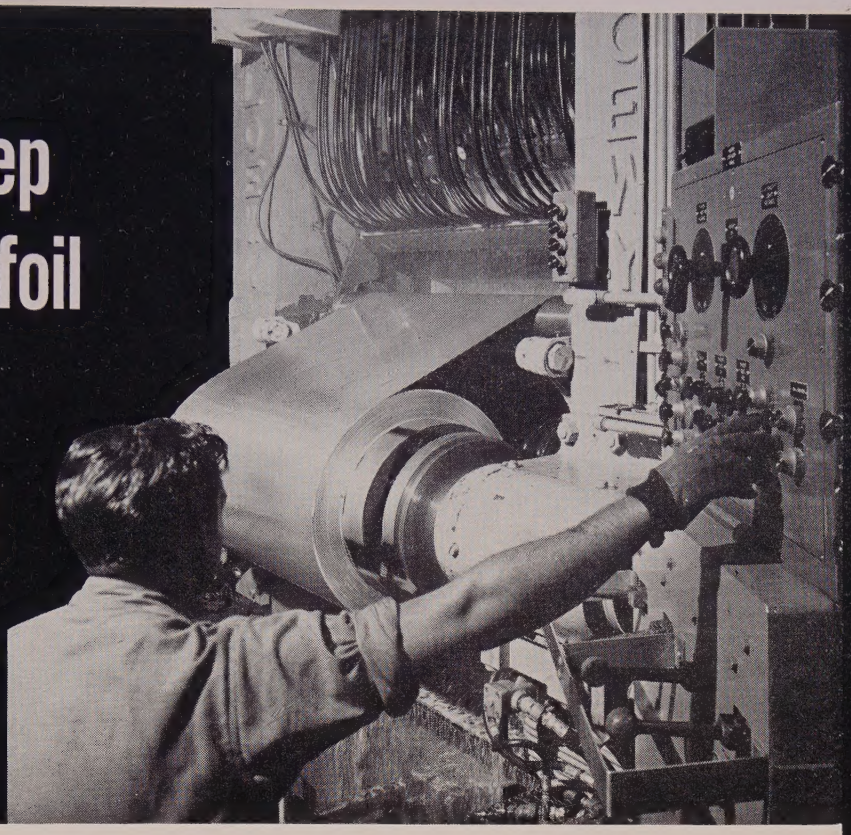
In Canada —
Air Reduction Canada Limited

All divisions or subsidiaries of Air Reduction Company, Inc.

AT THE FRONTIERS OF PROGRESS YOU'LL FIND AN AIR REDUCTION PRODUCT • Products of the divisions of Air Reduction Company, Incorporated, include: **AIRCO** — industrial gases, welding and cutting equipment, and acetylenic chemicals • **PURECO** — carbon dioxide — gaseous, liquid, solid ("DRY-ICE") • **OHIO** — medical gases and hospital equipment • **NATIONAL CARBIDE** — pipeline acetylene and calcium carbide • **COLTON** — polyvinyl acetate, alcohols, and other synthetic resins.

how to keep aluminum foil from shattering

... at 35 miles per hour!



Kaiser Aluminum & Chemical Corp. increased annual production of aluminum foil 50% at its Permanente, California plant through installation of a four high foil mill. This mill reduces aluminum strip in thickness from .026 to .00025 of an inch at speeds up to 3000 fpm.

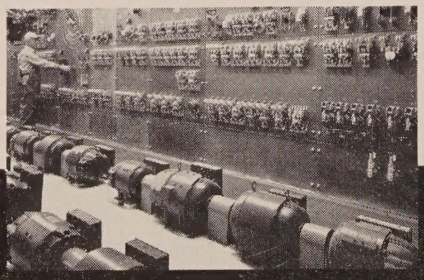
At 35 miles per hour, excessive strain at any of the several reduction stages would shatter the extremely thin foil. From the original payoff reel through to the final rewind, uniform tension is provided by Reliance V★S Drives.

Reliance engineers designed this drive specifically for this mill, to provide the constant uniform tension which is so important.

This application is typical of the many diversified jobs that Reliance V★S Drives are called upon to perform. There is a Reliance V★S Drive to fit your application.

D-1562

For further details, write **Dept. 46A**

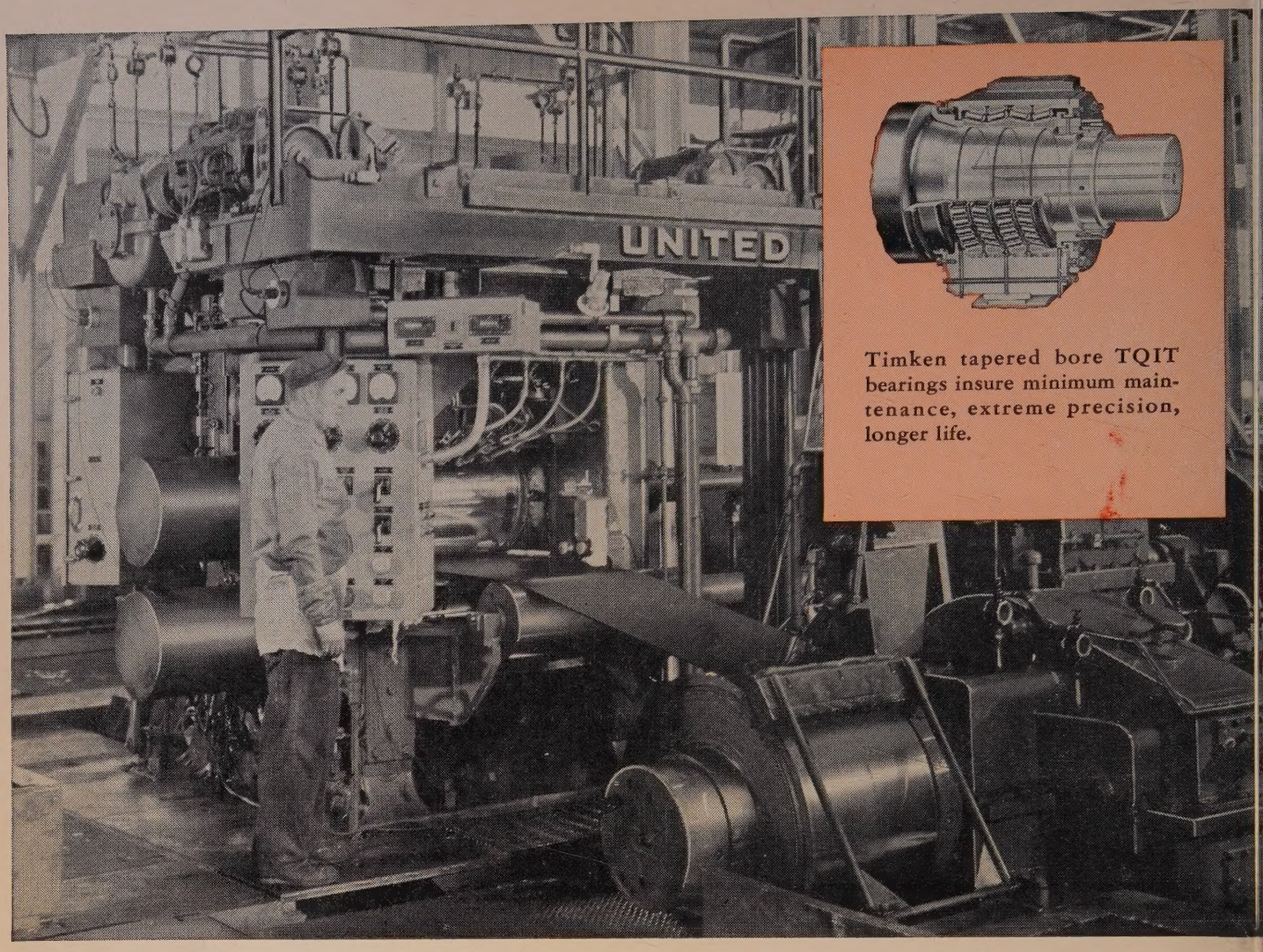


Main control room—Where Reliance equipment provides more than 2,900 hp. to drive this mill.

RELIANCE ELECTRIC AND ENGINEERING CO.

CLEVELAND 17, OHIO • CANADIAN DIVISION: WELLAND, ONT.

Sales Offices and Distributors in Principal Cities



Timken tapered bore TQIT bearings insure minimum maintenance, extreme precision, longer life.

2-high temper pass mill starts faster, runs smoother on TIMKEN® TQIT bearings

THIS 2-high temper pass mill, built by United Engineering and Foundry for Alan Wood Steel Company, uses tapered roller bearings of the TQIT type, designed and developed by The Timken Roller Bearing Company.

Higher mill speeds are possible with Timken® bearings. They reduce starting resistance. That's because Timken bearings practically eliminate friction. Their geometric design gives them true rolling motion. Precision manufacture makes them live up to their design. All this makes for smoother, more dependable operation.

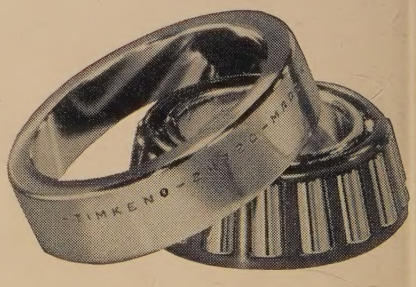
Timken tapered bore bearings combine interference fit with easy removal. They can be removed from the roll neck by expanding the cones hydraulically. Excessive scuffing and neck wear are eliminated. Greater stability between cones and roll neck distributes the load within the bearing. Improved fillets and larger necks are possible. This means you get the lowest possible neck stress and deflection.

Lubricant costs are cut because Timken bearings use economical grease lubrication. No lubricant is lost during roll changes. And rolls can be changed faster because there are no tubes or pipes. The tapered design of Timken bearings lets them take radial and thrust loads in any combination—no need for special thrust bearings that increase costs and complicate designs.

Be sure you get all the advantages of Timken TQIT bearings in the machines you buy or build. For more information call or write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

TIMKEN BEARING EQUIPPED

This symbol on a product means its bearings are the best.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS ROLL THE LOAD